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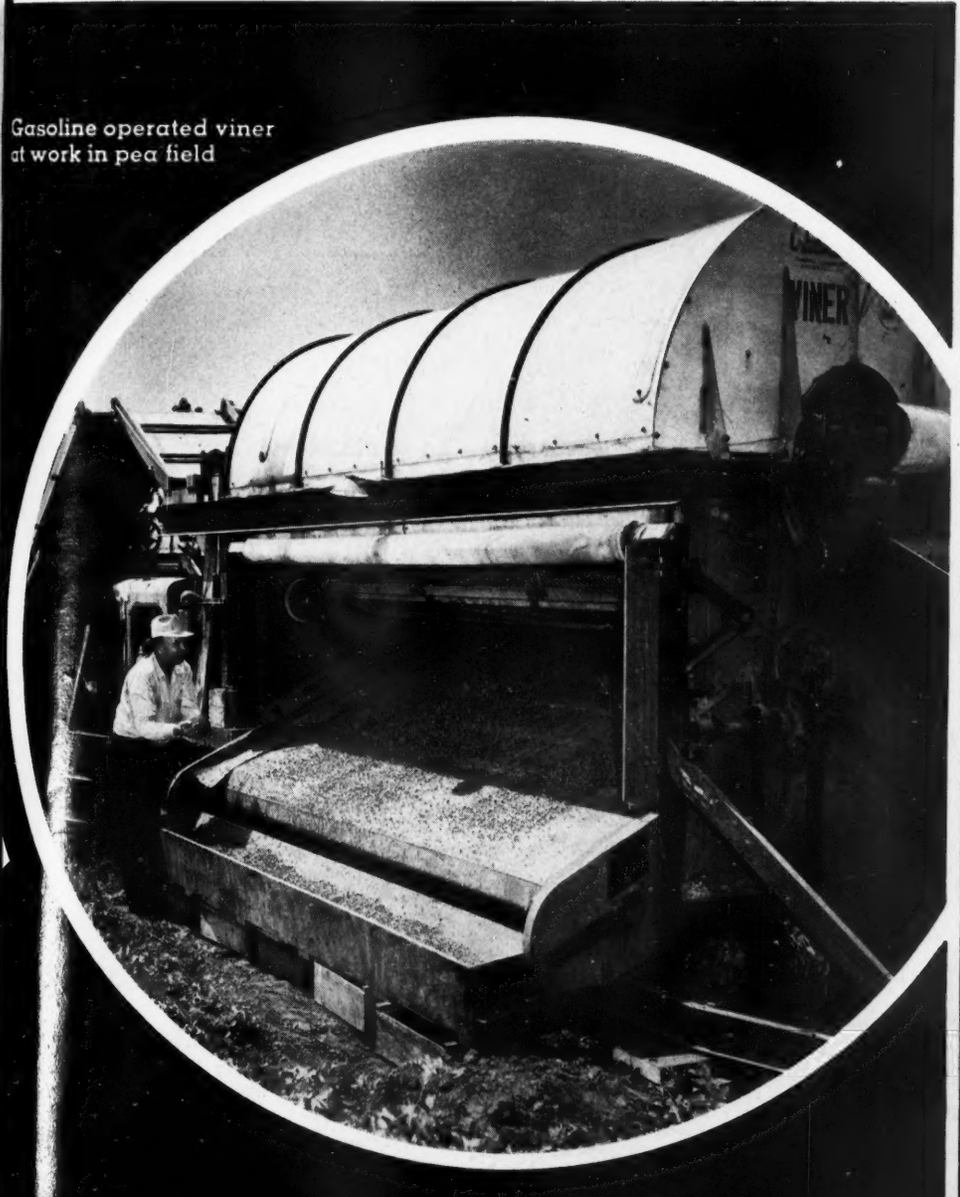
FOOD INDUSTRIES

• FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Gasoline operated viner at work in pea field

NOVEMBER 1946

How to Handle Corn Sirup

Guava-flavored Pectin Powder

Feed Water Treatment

Finding Out How Foods Spoil

Heating by Super High Frequency

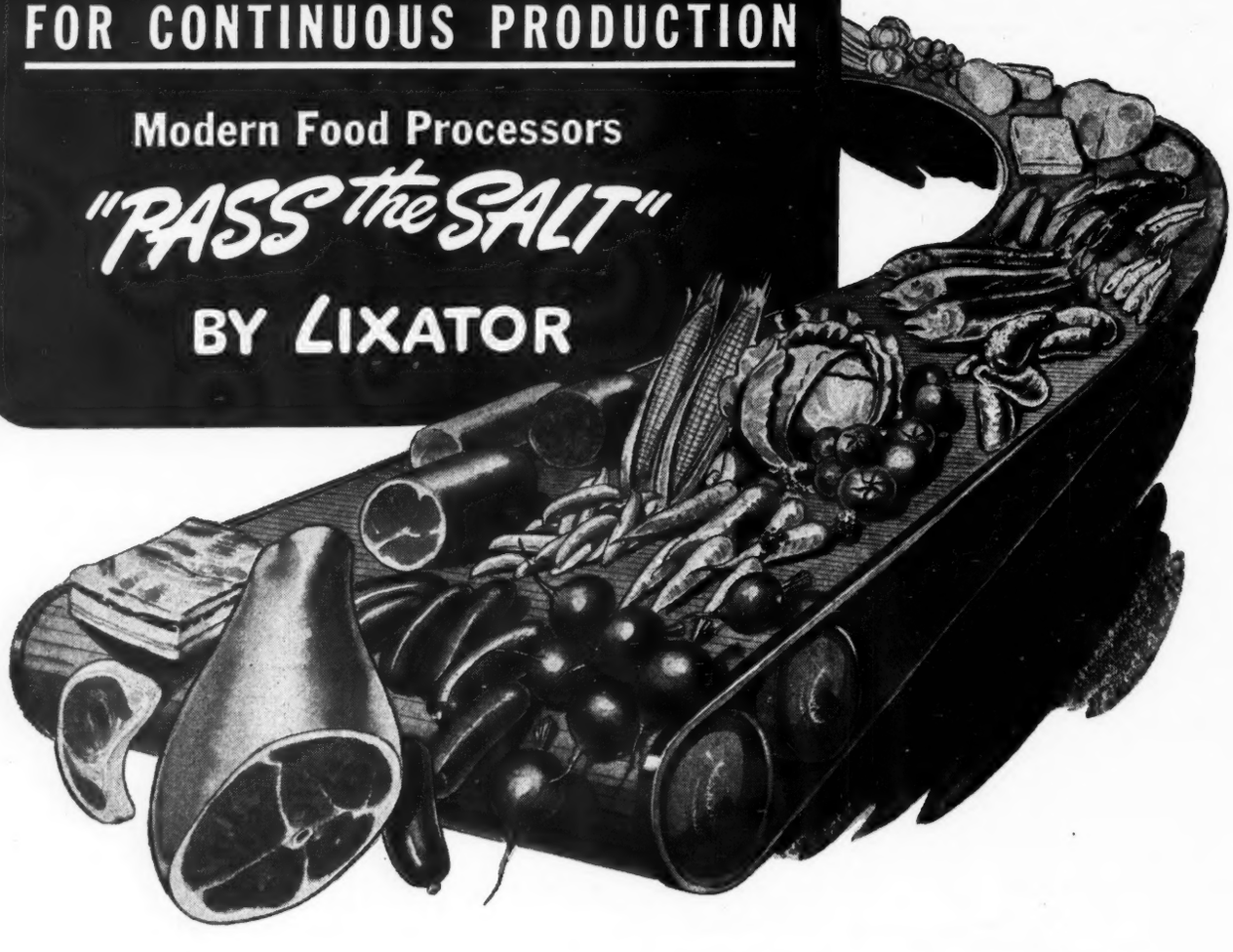
Proper Packaging of Frozen Meats

Formulas and the Law

McGRAW-HILL PUBLICATION

FOR CONTINUOUS PRODUCTION

Modern Food Processors "PASS the SALT" BY LIXATOR

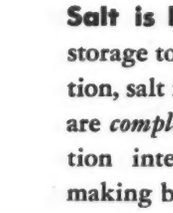


The Lixate Rock Salt Dissolver will help keep production on a continuous basis in your plant by providing crystal clear brine *at the turn of a valve,* whenever and wherever needed.

Salt is handled only once—from nearby storage to the Lixator. Control of brine production, salt feed, water input, and brine discharge are *completely automatic*. There are no production interruptions while handling salt and making brine.

Lixate Brine contributes to the efficient operation of modern food plants of all kinds. Meat, vegetable, fish and other food processors find the quality of Lixate Brine eminently satisfactory for the curing, flavoring, pickling and preserving of different foods.

The Lixate Rock Salt Dissolver comes in a variety of sizes, to meet any needed brine requirement.



Get the full story. Learn how others have boosted efficiency, cut costs. It's the way to continuous production. Write today for "The Lixate Process for Making Brine."

INTERNATIONAL SALT COMPANY, INC., (Dept. FI-11, Scranton, Pa.)

*Name*_____

*Firm*_____

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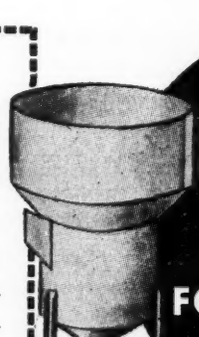
*City*_____ *State*_____



The LIXATE *Process* FOR MAKING BRINE

★ ★ ★

INTERNATIONAL SALT COMPANY, INC.
Scranton, Pa.

Benefits of Low Price Ceilings

Price controls at the manufacturer's level have not been a wholly unmitigated evil for all concerned despite the very real economic hardships that many a food manufacturer has been forced to endure. It depends on the adroitness and adaptability of management.

Take an actual situation with which I am fairly familiar as an example. Company A makes the same product as Company B. Company A uses a batch process of manufacture, while Company B uses a continuous process. The production costs of the batch manufacturer are materially higher than the costs of the continuous process. And OPA allowed a ceiling price to the higher cost producer that was extraordinarily far above Company B's ceiling.

Though neither firm had lost any money, the management of Company B rightly maintained that OPA permitted scant reward for the research and expense of installing the continuous process, while Company A, with old style facilities and equipment, was permitted to derive the same reward as if it, too, had been far-sighted and aggressive.

Pricing Anomaly

Company B was compelled by OPA to undersell its competition but, because of scarcity of raw materials and ingredients, it cannot even operate at capacity, let alone supply its regular customers' orders. And certainly it could not invade the territory of the competition.

The head of Company B feels aggrieved that OPA did not permit enough profit to compensate the cost of developing his present process. For if he had not adopted the new process he would have been able to operate the old plant at a profit, thanks to OPA's method of fixing ceiling prices in this particular case. (OPA has not always been as kindly to the high cost producer.) He feels that in justice he should have been allowed a higher ceiling, particularly in view of the shortages that prevent his operating today at capacity, whereas the OPA ceiling differential between the competitors was based, in his case, on continuous operation of the process at full capacity. The batch operator does not, however, suffer a comparable cost increase when operating at less than capacity. (This is the only detrimental aspect of a continuous process.) So Company B folks are pondering the odd situation in which there appears no immediate advantage to the low cost producer.

It is only common sense that the low cost producer will have the competitive advantage when the times are more nearly normal and price controls no longer exist. In fact, Company B gains another advantage, though it would be difficult to convince the management of it today. It is indisputable that the concern, forced to go along under the existing difficult conditions, will have learned something of considerable value when fierce competition of normal times is the rule rather than a dim memory of pre-war years. Without question Company B will be in a better position to take care of itself than Company A, which has been allowed the much higher price ceiling.

Post-OPA Hazards

The chief hazard that appears to face the future of Company B will be the matter of pricing its products when all controls are released. If it were to retain the existing price differential it would surely be a thorn in the flesh of the competition. Company A might be forced to adopt comparable manufacturing technics. Yet A could not duplicate B's process without patent infringement. He might develop improved processes of his own.

Another potential advantage accrues to B that more than offsets the present grievance. He has been accustomed to getting along under an absurdly low selling price. He can meet all potential direct competition in post-OPA days. And while the patents covering his process have not been litigated, it would be foolhardy to attempt to break them. If he should hold any desire to acquire A's business, he need only hold to today's relative prices to convince A of the desirability of discussing the matter at length. Or he can live and let live, having gained considerable strength and experience under a gross disparity of ceiling prices.

Experiences of other firms in other lines under OPA do not compare with the foregoing in detail. Yet those who have learned to live under comparable price adversity are likely to be the successful firms when all price controls are removed, and competitive bidding returns.

L. V. Burton EDITOR

The Talk of the Industry

• MOSCOW radio boasts that prices in the Soviet Union have been cut 40 percent while prices in the U. S. continue to rise. But Moscow omits all mention of the fact that nobody ever strikes in Russia. It's very unhealthy there to refuse to do what is ordered.

• AROUND Packingtown, meat packers always used to say that the beef department was the sink-hole into which most of the profits of other departments disappeared. Pork packers were the ones who always made the profits. It takes longer to raise beef than to raise hogs. Hence the prospect for packer profits in 1947 should be good.

• FROM recent events it would appear that the farmers of the nation are learning what they should have known back in the depression years. It should now be apparent to everyone engaged in agriculture that the easiest way to siphon more money from urban dwellers is to hold back on food—especially good tasting food.

• PEOPLE are willing to pay handsomely for food when they really want it. A lady of our acquaintance paid $2.00 for just two lamb chops and congratulated herself on her good luck. When it was suggested that it was black market stuff she was downright indignant. Her butcher was an honorable man who wouldn't stoop to black marketing. She had done business at his store for all of 15 years. Two dollars was the going price and if you want meat you have to pay it! Black market! Perish the thought!!

• IF the farmers of the nation should ever form as tight an organization as CIO they could get almost any price the traffic would bear.

• THE loudest yelps about farmers' "sit downs" and "holding off" food come from members of Congress—chiefly the ones whose pro-labor attitude has given this nation the great gift of endless strikes, continually rising costs and industrial strife.

• IN our opinion the farmers have not been striking. When labor quits work it's a strike. When a farmer keeps on working, but refuses to sell his animals at a loss before they have consumed the feed he has produced, that is not a strike. If farmers should really strike it would mean starvation.

• BEST comeback of the month came from Chairman Thompson of Price Decontrol Board. After receiving many complaints about meat scarcity from members of Congress, he remarked that he would expect Congressmen to know what sort of a law they had handed him to administer. Which goes to prove that Theodore Roosevelt was right when he said the quickest way to get rid of a bad law is to enforce it.

• AN interesting combination of natural drying with food processing occurs in Latin America where limes are converted to a concentrated juice by an unusual method. First they are revolved in a barrel lined with fine short spikes pointing inward. This liberates the lime oil which is washed off and recovered. The "pricked" washed fruit is then sun-dried to roughly half its previous weight, then pressed to yield a concentrated lime juice.

• CONSIDER the case of the dairy company that had purchased a homogenizer of a new type. It did strange things to the milk, seemingly breaking down the casein and causing a sediment-like precipitate. Samples of the sediment were sent to the machine maker with a request for an explanation. Under the microscope the sediment proved in this case to be diatoms.

You figure it out.

Hors d'Oeuvres

• The 10th National Donut Week will be observed next March 9 to 15. If it's time to get ready you need, here it is.

• *Don't be surprised if some day you buy fruit spreads—made of tomatoes, says the American Magazine. We'll try not to be, but right now being able to buy fruit spread made of anything leaves us gasping.*

• Fish are agricultural products, according to the Department of Agriculture. You can go up to Gloucester, Mass., any time, and watch the farmers going "down to the farm in ships."

• *Tom Reid used to be Director of Personnel at McCormick & Co., Baltimore. Now he is Director of Human Relations. No matter how you look at it, this is really biting off a chunk.*

• George Washington's signature weighs .00089 grams, says the electrical manufacturer's Empic. Such delicate scales, however, are a little too expensive for installation in sugar refineries.

• *Eddie Rickenbacker is quoted by Pathfinder as saying, "Don't talk to me about mass air travel until I can sell you a ticket . . . and tell you that you'll be there on Tuesday at 2'clock in spite of—or high water. It will be all right with us to get there in spite of—but none of those high water landings for us.*

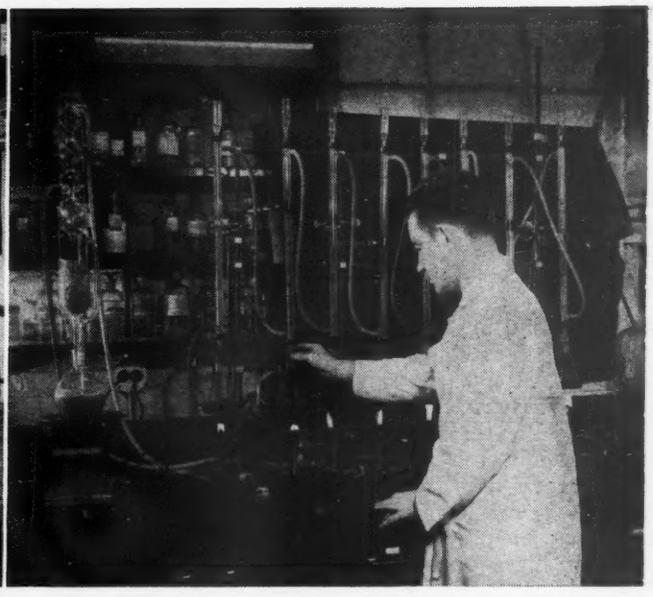
• At the instigation of the American Dairy Association, Gary Cooper, Paulette Goddard and others are helping to promote cheese in a new DeMille epic. Although the cheese isn't Limburger, the name of the picture is "Unconquered."

• *GMA tells us that Log Cabin sirup was so named because its founder was an ardent admirer of Lincoln. It must be admitted that G. Washington coffee turned in a more direct approach.*

• There are reports of a new electronic instrument that can determine the amount of moisture in gases. This would seem to be an ideal defense against bond salesmen.

• *Borden's quotes the Public Health Service as saying, "Of all the factors of man's development, none is more important than food. Of all the foods, none is more important than milk." This might be backing into Borden's proposition, but it gets there.*

• The American Magazine wants to know if we are having any trouble cracking those three minute eggs at breakfast. No, but crunching the bacon got completely beyond our strength during the meat famine. J.A.J.J.



Microbiological technic is important in two ways. It is used to identify contamination by any bacteria, yeasts and molds, and to evaluate vitamin changes. The more conventional tests, chemical, physical, biological and organoleptic, may furnish useful data.

HOW FOODS SPOIL*

Factors responsible for spoilage are physical, chemical and biological. If a processor knows the nature of these causes, he can avoid losses and produce a superior quality product by proper technical control

By BERNARD L. OSER, Director
Food Research Laboratories, Inc., Long Island City, N. Y.

THE palatability and nutritive value of a food depend on its entire history, from the first phases of production through the final steps in its preparation for human consumption. An intelligent approach to the problem of preserving or improving the quality of foods requires a thorough knowledge of the many ways in which they may spoil during their devious journey from the farm through plant, warehouse, and store to the consumer's table. Improper handling by any one of a large number of food specialists, farmers, carriers, processors, refrigerators, wholesalers, jobbers, retailers, or housewives may result in a product which is unfit for sale or for use.

Spoilage embraces changes that render foods unattractive, unsaleable, or unwholesome. Spoiled food may be non-injurious, but may nevertheless be unfit to eat. The stock terms used to describe spoiled food by the Food and Drug Administration are "filthy, putrid, and decomposed." It does not necessarily follow that all filthy, putrid, and decomposed foods are inedible. For example, flour containing fragments of weevils may be said to be filthy, yet certain arbitrary tolerances are permitted. Limburger cheese owes its popularity, such as it is, to the process of putrefaction by which it is made. Soy sauce is likewise manufactured by a process of enzymatic decomposition. Yet none of these is either inedible or uneaten despite these characteristics. In many cases, selected microorganisms are deliberately inoculated into food products in order to produce certain specific types of decomposition.

Accepting this broad definition of the term "spoilage", the causative factors involved are physical, chemical or biological. These rarely proceed as single processes but usually go on simultaneously or in sequence so that any actual case of spoilage may be of an extremely complex nature.

Spoilage by Radiation

Among the physical factors which may favor food spoilage, one of the most important is radiation, which may be visible, ultraviolet, or infrared. Light, or visible radiation, may cause discoloration or undesirable flavor changes. Beer is packed in dark bottles for this reason. Beverages containing true fruit bases are often quite susceptible to this agent. Exposure to direct sunlight may cause an oily or terpene-like flavor. Ultraviolet radiation, used for its bactericidal value, often introduces complications so that those who employ this means of sterilization must beware

* Based on a paper presented before the Great Lakes Section, Institute of Food Technologists.

of inducing some other form of spoilage. Thus, while bacteria or molds in meat are destroyed by ultraviolet radiation, simultaneously fats may be oxidized, and off-color may result, due to methemoglobin formation. Milk left on the front door step loses much of its riboflavin content upon exposure to sunlight for even a few hours.

The control of infrared irradiation, more commonly referred to as heat, is of course the very essence of food processing and preservation. Excessive heat may result in dehydration, loss of volatile flavors, alteration of protein, or changes in weight, volume, texture, and general appearance. The processor who employs heat for sterilization purposes must guard against these undesirable changes. In general, since most chemical changes and, within certain limits, most biological changes occur more rapidly at higher temperatures, the necessity for careful control during processing is well recognized, as is also the advantage of refrigeration during prolonged storage wherever practical and economically feasible.

Spoilage by Pressure

Among the mechanical factors often responsible for food spoilage is pressure. Crushing, pressing, or bruising frequently make fruits and vegetables unsaleable. Even where the damage is not complete, there is often loss in weight and nutrients due to the expression of liquids. Breaking of a protective coat like a peel or shell may produce not only deterioration in physical appearance but loss of liquid by evaporation or loss of vitamins catalyzed by the enzymes liberated upon cellular destruction. Another physical change in a food product which reduces its saleability is the shaking down of powders, such as baking powder packed in glass. Excessive headspace gives the illusion of short measure and in fact raises the possibility of violating the law against deceptive fill of containers. Analogous to this is separation of the oil from peanut butter or from salad dressing due to its lower specific gravity.

Freezing

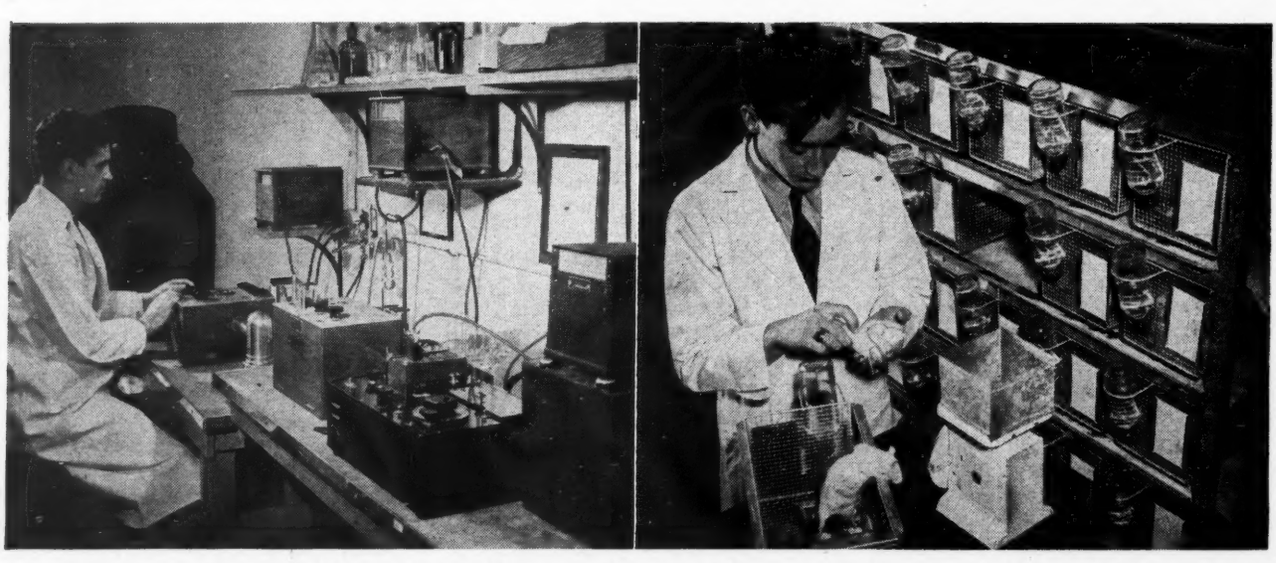
Freezing is a most effective means of food preservation, primarily because the rates of physical, chemical, and biological changes are considerably retarded at low temperatures. However, freezing must be carefully controlled if undesirable changes in flavor, texture, and keeping quality are to be avoided. Uncontrolled freezing of foods due to unexpected climatic conditions is a common cause of food spoilage. Frozen fruits, particularly citrus fruits, are sometimes completely ruined from a commercial standpoint. Such fruit is frequently flat in taste, changed in texture, and is sometimes discolored. Spoilage in such products due to freezing is the antithesis of controlled quick freezing which is utilized for purposes of preservation. In the former case large ice crystals are formed which disrupt cell walls, whereas in the latter the crystals are so small that cellular disintegration does not occur. Aqueous liquids expand on freezing. Sometimes they expand sufficiently to break their containers. Wide fluctuations in temperature are particularly harmful to emulsions. For example, excessive cold may result in an irreversible separation of salad dressings or tomato juice.

Dehydration

During the past decade, and especially under the stimulus of the war, dehydration has become a major food process. Dehydration results in inhibition of the growth of molds, yeasts, and bacteria, and if the dehydration is carried far enough, in an inhibition of chemical and biological changes such as non-enzymatic browning of foods and concomitant deterioration of flavor. As is the case with freezing, the dehydration process must be conducted under carefully controlled conditions, lest food spoilage occur due to excessive heat, to residual moisture content, or to other factors.

Mechanical spoilage of foods includes the presence of foreign bodies such as metallic, glass, and rust particles. Their presence may result from carelessness or the use of poor materials, poor equipment, or occasionally sabotage. Mechanical stirrers, scrapers, drums, and other parts of processing equipment should be solidly constructed with smooth surfaces of sanitary design, easy to take apart and clean, with no dead ends or sharp corners to permit accumulation of dirt.

Chemical food spoilage includes changes due to enzymatic action, atmospheric or other oxidation, reduction, metallic catalysis, hydrol-



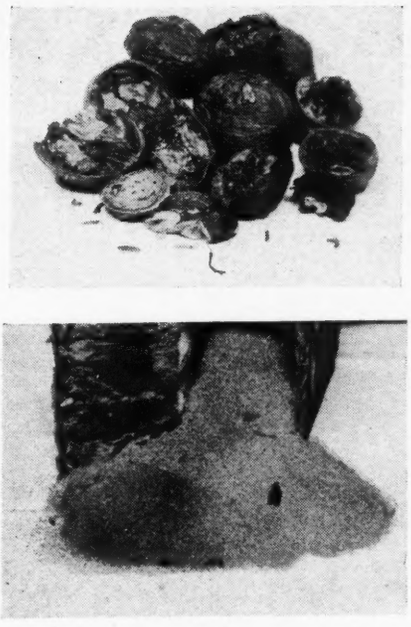
Photometers are used to measure color, turbidity and fluorescence in studying food spoilage problems. Vitamin losses, the reactions associated with non-enzymatic browning and metallic contamination are determined by these precise, time-saving devices. Animal feeding tests are resorted to in studying the more obscure causes of food intoxication. Rats are used because of their rapid growth.

ysis, improper pH or incompatibilities, i.e. reactions among various ingredients.

Enzymatic Changes

The enzymatic systems which are so important to the life process of a plant or animal do not stop abruptly when the fruit or vegetable is picked for market or when an animal is slaughtered. Unless effectively inactivated, these catalysts continue to function during processing and storage and are responsible for a considerable amount of food spoilage. Oxidative enzymes catalyze the destruction of ascorbic acid and are responsible for deterioration of flavor. Proteolytic and related enzymes are frequently encountered in the case of meat, especially glandular meats, and whole fish. In the case of such products, autolysis and putrefaction occur quite rapidly because of the high concentration of enzymes present. Other enzymes may be lipolytic, causing the breakdown of fats to glycerol and free fatty acids; while amylolytic enzymes cause the hydrolysis of carbohydrates. The fatty acids formed in the breakdown of fats by lipolytic enzymes may be acted on by lipoxidases with the formation of the peroxides and aldehydes associated with rancidity. Oxidation, however, is not necessarily limited to that catalyzed by enzymes, but may be atmospheric in part. This factor may operate to a considerable extent in the destruction of nutrients, for example the loss of vitamins in cooking. Inorganic or metallic catalysis may also operate in food spoilage. Thus, copper catalyzes the destruction of vitamin C, and produces a fishy, tallow-like flavor in butter or milk.

The proper control of pH is of critical importance in food processing. Some natural pigments, like the anthocyanins of red cabbage, beets and many fruits, are acid-base indicators so that their acidity frequently determines their color. Alteration of pH may produce a precipitate which may adsorb pigments and thus produce alteration of color intensity as well as of color quality. Fats, proteins, and carbohydrates may undergo undesirable changes at unfavorable pH. Vitamins are particularly susceptible. Thus, vitamin A is unstable in acid media; thiamine and ascorbic acid are rapidly oxidized under neutral or alkaline conditions. Pantothenic acid is stable only in the neutral range. Because of this type of destruction, it is sometimes impossible to preserve all of the vitamins in a given product. Particular difficulty arises in attempts to stabilize pantothenic acid and thiamine simultaneously. The latter is stable only in acid media, whereas pantothenic acid decomposes under these conditions. The stability of emulsions is often dependent upon pH. Unless the acidity is controlled within narrow limits, an emulsion or gel, such as lemon pie filling, may separate.



More apparent infestation is detected by gross inspection. Foreign matter, unseen by naked eye, is identified by flotation and microscopic examination. (Top): Moth-infested nuts. Cold storage and frequent fumigation are indicated. (Bottom): Moths in damaged or non-insect-tight packages.

Non-enzymatic Discoloration

The reaction between two nutrients in the same product may result in food spoilage. Perhaps the most serious problem in this category is the melamine reaction, more commonly referred to as the non-enzymic browning of foods. The pigmentation is caused by the reaction products of certain amino acids or other organic nitrogenous components and sugars. Darkening is inhibited by low pH and low moisture content, although it is not stopped completely. Thus, even dehydrated foods with low pH darken during storage. This reaction is accelerated by increase in temperature. For example, it was the experience of one packer of mushroom soup, that in the manufacture of each batch, one portion was light in color, whereas another portion was dark because of this melamine reaction. Investigation showed that darkening was caused by differential heating in a retort, the darker portion being exposed to greater heat. Even at ordinary storage temperatures on retailers' shelves, darkening due to the melamine reaction is noted in dried soup mixes, fruits, vegetables, milk, eggs and other foods containing both protein and carbohydrate.

Reaction of Nutrients

Incompatibilities between nutrients frequently occur in the case of vitamins. Noted examples are those between vitamin A and C in alcoholic solution and between niacin and vitamin C. A striking case of incompatibility is to be seen in chocolate sirup improperly fortified with iron. Here added ionizable iron reacts with the tannin from cocoa to produce iron tannate which imparts a bluish tone to milk drinks prepared from the sirup.

Reduction Reactions

Food spoilage occasionally results from reduction reactions. Metals used in the manufacture of cans may react with acid contents, producing hydrogen gas which swells the container. Bacterial reduction arising from improper sterilization may occur due to anaerobic bacteria with the resultant formation of hydrogen and sometimes methane.

Metal Contaminants

Chemical contaminants have been shown to cause food spoilage where only the taste is affected or, more seriously where food poisoning results. A case of antimony poisoning has been reported from cooking foods in grey enamel utensils of poor quality. Cadmium poisoning has been traced to cooking acid liquids in cadmium-plated metal containers. The danger of this type of contamination is also present in the use of cadmium-plated refrigerator freezer units. Although zinc is not usually regarded as a toxic metal, poisoning from this source has occurred after eating apple sauce cooked in galvanized iron kettles. In this case the symptoms were probably the result of the astringent action of the metallic salt. Caution should be exercised in packaging foods like meat and fish pastes in collapsible tubes fabricated from lead alloys inasmuch as contamination from this source has been known despite plating or coating.

(*Turn to page* 214)

How To Handle Corn Sirup

Handling viscous liquids, especially in a one story plant, presents problems. Equipment needed for corn sirup depends on whether deliveries are in barrels, tank trucks or tank cars. An engineer tells how to handle sirup in your plant

By A. EDWARD FILIPPON, Sales Service Engineer
Corn Products Sales Co., New York, N. Y.

CORN sirup is one of the principal products of the corn products refining industry. It is used in the manufacture of bakery products, beverages, chemicals, coffee, confections, ice cream, paper, pharmaceuticals and textiles, and in the processing of meats, tobacco, leather and many other vital products. The purpose of this article is to acquaint sirup users with convenient methods for handling and storing bulk corn sirup.

At the present time bulk corn sirup is sold as follows:

25 gal. wood barrels
50 gal. wood barrels
50 gal. non-returnable steel drums
50 gal. returnable, open-head steel drums
1,000 gal tank trucks
8,000 gal. R.R. tank cars

Sirup has a high coefficient of friction. The viscosity of 43 deg. Be. sirup is 300 poises at 90 deg. F. and 80 poises at 110 deg. F. This shows the importance of heating as an aid to pumping and handling. In heating sirup, however, particularly crystal white sirup, care should be taken to avoid darkening due to overheating. A temperature of 100 to 110 deg. F. is warm enough to permit satisfactory handling.

Viscosity is the resistance of a liquid to change in shape, or place. In other words it is a resistance to motion. For this reason the velocity of viscous fluids in pipes should be kept low—from 0.5 to 1 ft. per sec., with corn sirup depending upon temperature. Thus, a 4 in. pipe line would be consistent with approximately 25 g.p.m. The high coefficient of friction causes waste of power at high velocity, particularly in small lines with high speed pumps. Pump displacement should be synchronized with the viscosity of the fluid handled to obtain satisfactory operation.

Pumping Problems

Positive displacement pumps, with liberal inlet and outlet connections, are necessary for handling materials such as corn sirup. The speed, capacity and hp. of pumps shown on the rating tables, are generally based on handling ordinary light fluids such as water. For handling more viscous materials, it is a good practice to operate the pumps at proportionately lower speeds, and with larger motors. A starter with an overload relay should be used to protect the motor. The specific gravity of 43 deg. Be. corn sirup at 100 deg. F. is 1.42528 or 11.88 lb. per gallon. The gravity of the liquid affects the horsepower requirements of the pump to the same degree that it affects the weight of the liquid.

One of the most important factors to consider in horsepower requirements is the dynamic, or friction head. It must be remembered that the viscosity of a fluid decreases when it is heated, and it is very important to know the viscosity of the liquid at the temperature at which it is to be pumped. If pump speed exceeds speed of flow, shock, vibration or vacuum hammer will result, regardless of whether the pump is rotary, piston, plunger, or any other type of positive displacement design.

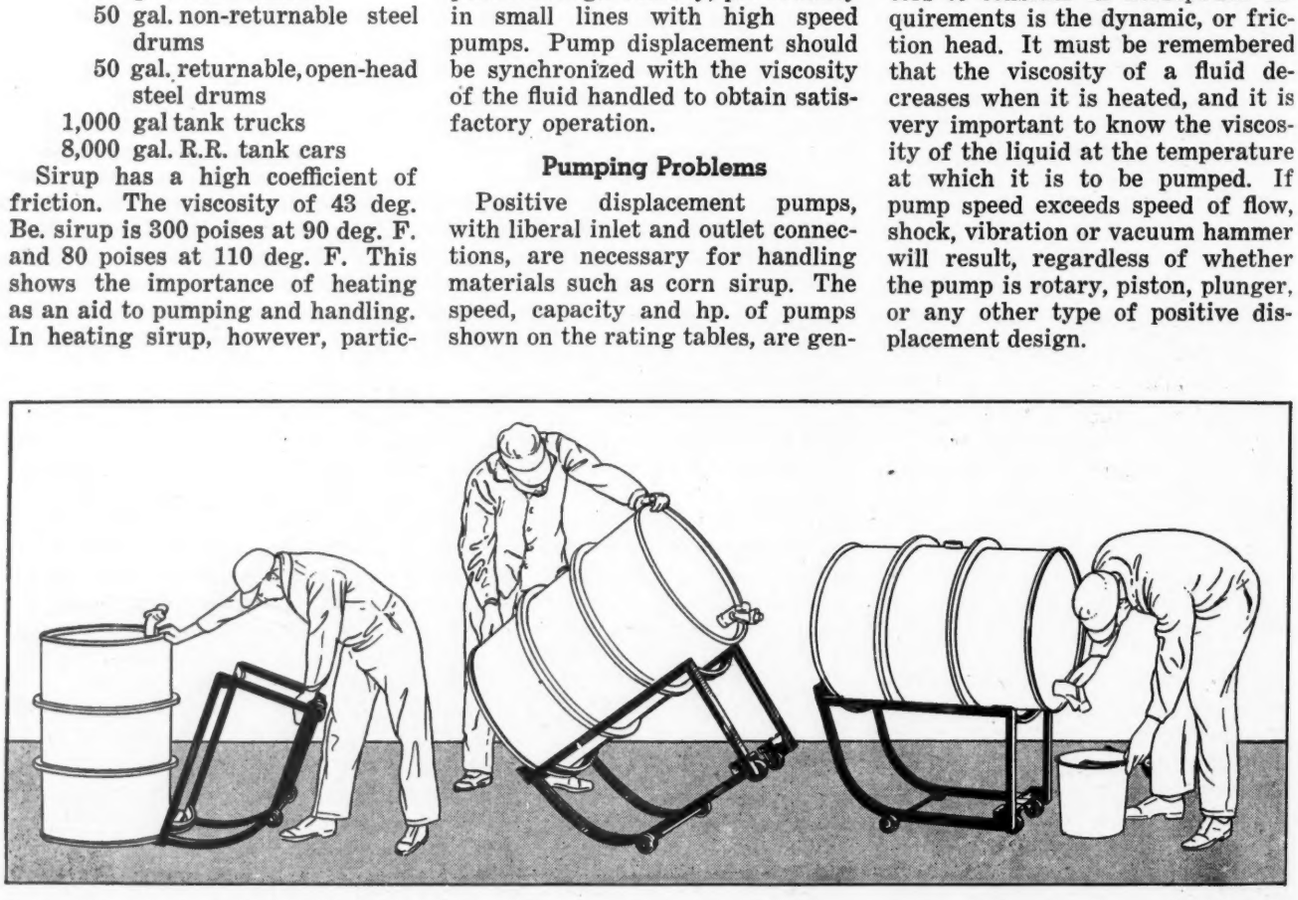


Fig. 1. When the quantity of corn sirup used is small the barrel can be mounted on a cradle and the sirup drawn into buckets.

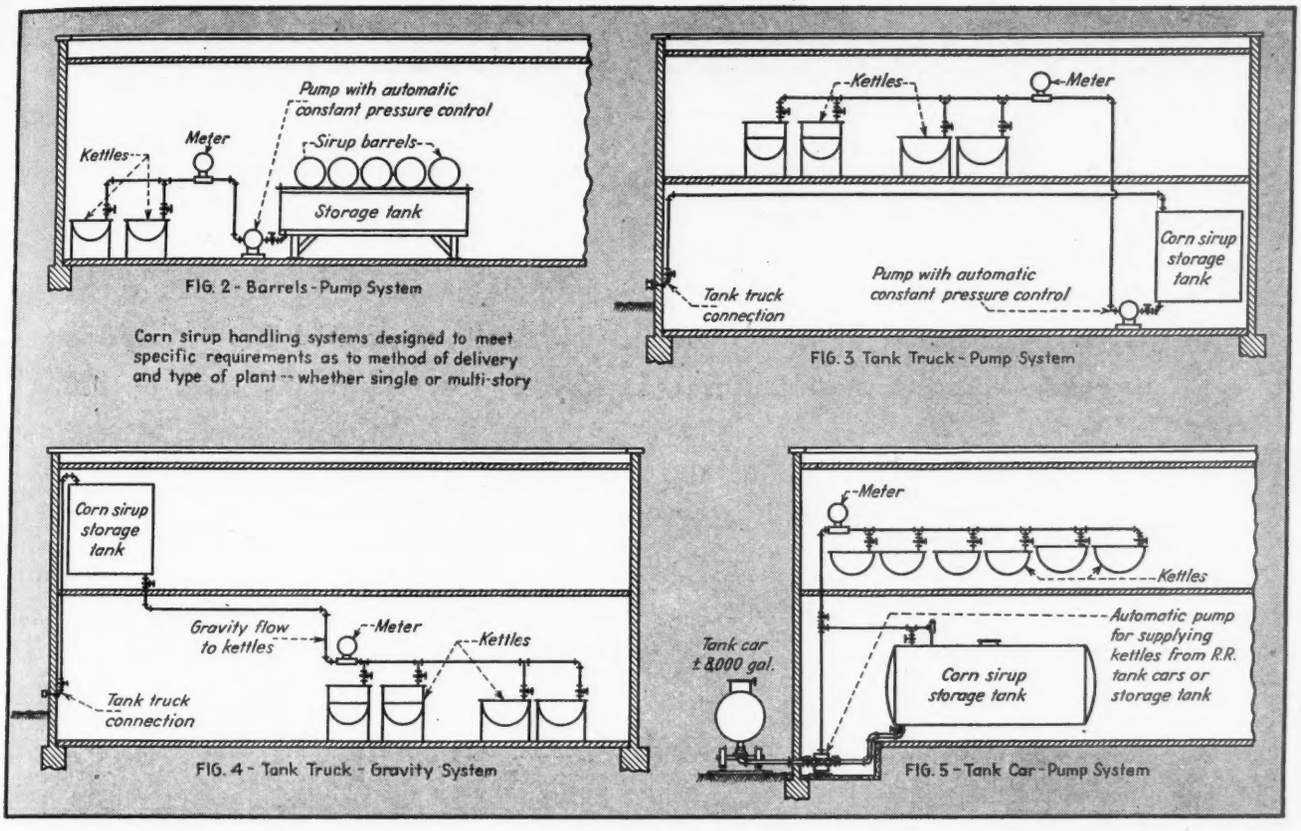


FIG. 2 - Barrels - Pump System

Corn sirup handling systems designed to meet specific requirements as to method of delivery and type of plant -- whether single or multi-story

FIG. 3 Tank Truck - Pump System

FIG. 4 - Tank Truck - Gravity System

FIG. 5 - Tank Car - Pump System

Obviously, cold corn sirup cannot be forced through a pipe line faster than its viscosity will permit. The belief that pumps with powerful suction can speed the flow of liquids beyond the mobility which their viscosity allows, is in error. Viscous liquids are highly resistant to suction lifts. Suction does not induce movement or increase speed of movement. It merely creates a partial vacuum and barometric pressure causes the fluid to fill the vacuum by flowing from the source of supply to the pump inlet.

Pumping problems decrease as viscosity decreases; and when we get to water, about which as a flowing liquid we know most, pumping problems appear in their simplest form. But as we move to more complex fluids, or semi-fluids, more knowledge born of experience must be applied to pump selection.

Metering Possible

Corn sirup can be metered accurately under proper working conditions. Meters are available that can be set at a predetermined number of pounds or gallons. All that is necessary is to trip the lever and the meter automatically measures the amount of sirup called for. A totalizer, fitted with a shutter, provides a cumulative total of all the liquid that has passed through the meter for the day, month, or year. A large selection of dials are available to suit each particular service requirement.

The pH of 43 deg. Be. corn sirup is 5.0, approximately. For this reason stainless steel or other special alloys are not necessary for handling and storage purposes, but are desirable. When using an ordinary steel tank for storage it is advisable to paint the inside top portion with warm corn sirup, or a suitable paint to prevent corrosion as the result of exposure to air.

Handling Corn Sirup

Customers buying corn sirup in barrels have a choice of several methods for handling the material, depending upon the amount of sirup used and on their particular field conditions. Some of the methods in use are:

1. Dip the sirup out of the barrel by hand.

2. Mount the barrel on a cradle, as shown in Fig. 1, and run the sirup into pails. The pails are weighed to determine the amount drawn off.

3. When the contents of one or more barrels are to be used at one time a chain hoist is erected, with suitable tackle, to raise the barrel and empty its entire contents into the batch.

4. Special troughs that will hold the contents of 5 or 6 barrels at one time can be designed. The trough, with suitable structural supports, is preferably located on a mezzanine above the kettles, or on the floor above, and the sirup is run by gravity through pipes to the kettles below.

5. In the case of a one-story building, a special trough can be designed to hold the contents of 5 or 6 barrels. It is equipped with an automatic pressure system as shown in Fig. 2. This makes it possible for the operator to draw sirup as needed. The trough, in this case, is used as a storage tank, permitting barrels to be well drained, thus reducing yield losses to a minimum.

Tank Trucks and Cars

In locations where the manufacturers maintain tank truck delivery service, or where railroad tank cars are used to deliver direct to the consumer's plant, real efficiency in storage and handling systems is approached. A valve is turned at the mixing kettle or cooker, and accurately metered sirup flows automatically. There is no manual handling, no loss of production and no factory congestion. The operation is entirely mechanical.

Fig. 3 shows a tank truck system with the storage tank located on the lower floor. The pump shown, equipped with automatic constant pressure controls, makes it possible to pump sirup to kettles located in distant parts of the plant. This is not possible with gravity type systems. Fig. 4 shows a similar instal-

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Guava-flavored Pectin Powder Is Rich in Ascorbic Acid*

How to produce pectin powder from the vitamin C rich, flavorful common guava that grows in profusion in the Hawaiian islands is described here. Product may be utilized in the manufacture of candies, ice cream and fruit nectars

By YOSHINORI KANEHIRO and G. DONALD SHERMAN
Hawaii Agricultural Experiment Station, Honolulu, Hawaii

IN the past decade widespread emphasis has been placed on the food value of guavas. With this growing interest there has been an intensive program of utilizing this fruit in various forms other than the customary preserves such as jams and jellies. During the war the army and navy have greatly accelerated this effort by turning to guava products as a relatively cheap source of vitamin C in their rations.[1] In some of the guava growing countries, guavas are canned, dehydrated into pastes and made into purees in addition to the production of jams and jellies.[1] Guavas are considered an excellent source of vitamin C. The common guava of Hawaii has been found to contain from 95 to 300 milligrams of ascorbic acid per 100 grams of fruit.[2] As a result of plant breeding work in South Africa, a new variety of guava has been developed. The fruit of this new variety was found to contain 900 milligrams of ascorbic acid per 100 grams of fresh fruit.[3]

Guavas have a pectin content that is about four times the amount required to bring the fruit extract to a jelly consistency.[1] This high pectin content and the high acid content of the fruit facilitate the production of guava jellies. Another very desirable property of guava pectin is its high solubility in water. Work at this station has revealed that over 90 percent of the pectin in ripe guava is soluble in water. This property can be utilized to separate the pectin with the juice from the pulp and seed with the minimum amount of heating.

There are two types of guavas growing in the Hawaiian islands, the Cattley, *Psidium cattleianum*, more commonly known as the strawberry guava, and the common guava, *Psidium guajava*, (Fig. 1). Owing to the very small size and the relatively low vitamin C content of the fruit, there has been no commercial utilization of the strawberry guava. The common guava, on the other hand, grows extensively throughout the Islands. In all probability it was introduced early in the nineteenth century. Because of its ready adaptability to the sub-tropical climate of Hawaii and the ease with which the seeds are scattered, the common guava has become the most dominant fruit growing in the uncultivated areas of Hawaii.[4]

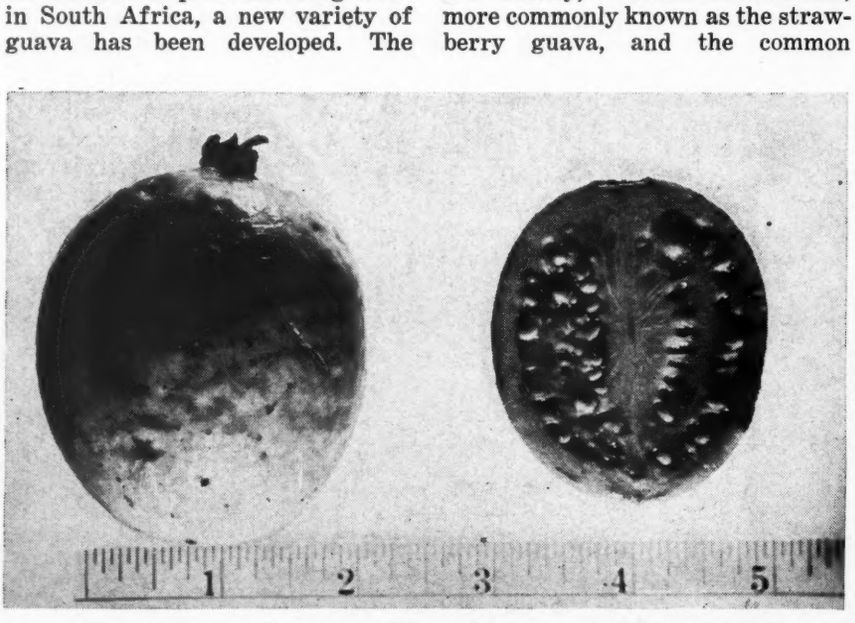

Fig. 1. The common guava—*Psidium guajava*—of the Hawaiian islands.

So far there has been no attempt to cultivate guavas commercially in Hawaii. Guavas have been used on a limited scale in the production of jams, jellies and juices. The production of a pectin concentrate would facilitate the distribution of guava products in the world food markets. It is desirable that any such product retain a high proportion of its vitamin C content and its natural flavor as well as the jellying properties of its pectin. This station has developed a procedure for the preparation of an attractive, dehydrated guava juice powder which retains these desirable characteristics. The product and a guava jelly prepared from the product is shown in Fig. 2.

Guava Juice Powder

As indicated in process flowsheet (Fig. 3) the whole guavas are crushed to a pulp and heated with an equal volume of hot water for approximately 30 min. It is nec-

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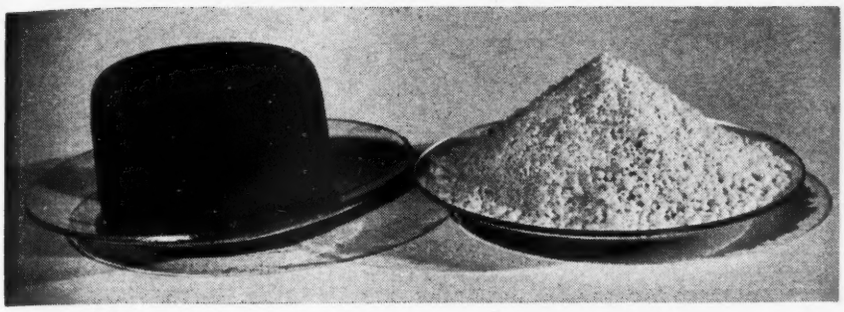

Fig. 2 Left: A 60 percent sugar guava jelly prepared from dehydrated guava pectin powder. Right: Ground dehydrated guava flavored pectin powder, vacuum dried.

essary to boil the mixture from 20 to 30 min. in order to extract the maximum amount of pectin, and in addition this heating will stop all enzymic action in the guava. The juice is filtered through a fine mesh cloth. The hot filtrate is used as the extracting agent for a second equal volume of guavas. The second batch of guavas is boiled and filtered in the same manner as the first. The extracted juice can be used as the extracting medium for additional quantities of guavas as long as the juice does not become too viscous for filtration. In this manner the total solids of the extracted juice can be increased. The first extracted filtrate contained slightly over 0.6 percent pectin and approximately 5 percent total solids. By means of a continuous system of extraction, the pectin content of the extracted juice can be increased to 1.2 per cent and a total solids content of over 8.5 percent.

It is not feasible to use for extraction purposes a solution which contains a pectin concentration much higher than 1.2 percent because of its high viscosity. Further concentration of the extracted juice is accomplished by evaporation under reduced pressure. This evaporation is continued until a thick sirupy liquid is produced which contains about 20 percent total solids. At this stage of the operation two parts of sucrose are added for every part of the concentrated extract. After thoroughly stirring the mixture, it is dehydrated by vacuum drying. No heat is applied at any time after the sugar is added, this precaution being taken to prevent caramelization of the sugar. When the mixture is sufficiently dehydrated, a very attractive cream-colored, crystalline-like product is produced (Fig 2).

The dry product can be ground into a fine powder in which form it can be conveniently packaged and thereby kept moisture free. This powder when stored in an ordinary moisture-proof bottle will keep for months without any sign of deterioration or caking. The dry product, which contains 3 percent water, will absorb moisture slowly if it is exposed to the air, and upon continued exposure of several weeks the product will cake and become discolored.

Although the dehydration of the product was accomplished by vacuum drying at this station, it seems feasible that an equally good or superior product could be produced by spray drying or by some other rapid method of drying.

Properties of the Product

A pectin prepared by this method retains all of the desirable characteristics of the guava. The excellent aroma and flavor of the fresh fruit are carried over to the final finished product. This fact makes it possible for the pectin to be used as a flavoring agent wherever the guava flavor may be desired.

The product prepared by this method retains 60 percent of the ascorbic acid values found in the original fruit. While this pectin can still be considered an excellent source of vitamin C, it is believed that the ascorbic acid retention can be increased by improved methods of extraction and faster drying.

The jellying properties of the pectin have not been altered by the dehydration. It may be made into a guava jelly by dissolving it in water, adding the required amount of sugar and boiling the mixture to the proper jellying point. Guava jellies were prepared with different proportions of sugar and very desirable jellies were produced when the sugar concentration was from 50 to 60 percent. When the sugar concentration was higher than 60 percent, the jelly had a grainy texture.

Chemical Composition

The guava pectin was analyzed for its chemical composition. The uronic acid content was found to be 76.65 percent and its methoxyl content 8.25 percent. These values are very similar to those found in other commercial pectins. The viscosity of a 0.5 percent solution of guava pectin was 7.45 which is in the range expected of a high grade pectin. From these evidences of the excellent qualities of the guava pectin, retained by the finished product, it can be concluded that such a product can be readily utilized as

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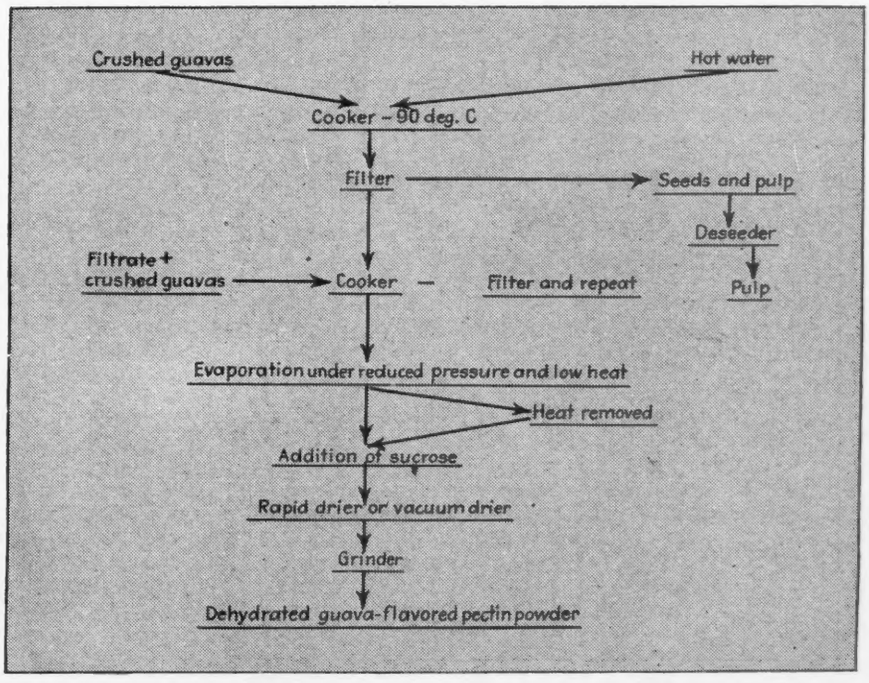


Fig. 3. Process flowsheet showing various steps in the production of guava pectin.

What is the Protective Value Of the Double Overwrap?

Does double overwrap multiply or merely double resistance to moisture penetration? Quantitative measurements show a threefold to fivefold increase. But heat sealing of wrappers may impair the barrier effect

By WILLIAM RABAK and J. B. STARK, Western Regional Research Laboratory, Bureau of Agricultural Chemistry, USDA, Albany, Calif.

THE degree of resistance against moisture penetration afforded by the double wrap has been the subject of much speculation[1] and in one instance the topic of an editorial[2]. Attempts have been made to develop mathematical expressions which will reliably predict increases in barrier effects of multiple overwraps. In spite of all this, the question remains unanswered in any definitive sense.

That the question merits further consideration can be seen in the fact that when frozen and dehydrated foods are stored over long periods loss or gain of moisture may occur. This may spell the difference between an edible or an inedible product and concomitant economic profit or loss.

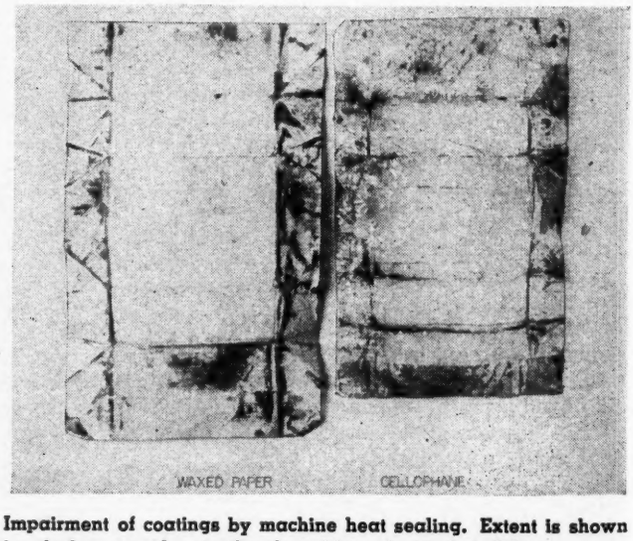
Theorizing on the extent of resistance against moisture penetration offered by multiple barriers, each of which is assumed to have inherent leakages, one might visualize the situation by a simple analogy. A person can walk almost as swiftly through two open doors as through one, provided the doors are closely spaced and directly opposite. However, if the doors do not lie in juxtaposition and the walls are in close proximity, the speed of passage is considerably retarded. But because mere theorizing on this subject does not appear to answer all the questions, an investigation has been made to ascertain the facts under controlled practical operating conditions.

Experiments have shown that the above homely example illustrates a typical characteristic of the separate double overwrap. The areas of maximum moisture leakage, which are at the end folds and side seams, are usually somewhat "staggered" or otherwise obstructed, because of the separate double wrapping operation. A definite retardation of water-vapor transfer results. The extent to which this operation increases the resistance is naturally dependent upon other important factors, such as type of wrapping material, character of seals, and temperature of sealing. Because of the number of variables involved, it is difficult to express the actual resistance afforded by multiple wrappings in mathematical terms. Accordingly, in order to obtain data on the effectiveness of the separate double overwrap, an experiment was conducted under controlled conditions as described below.

Test Methods

The experiment was essentially a comparison of the moisture resistance of single and double overwrapped paperboard frozen food packages. Two types of heat-sealable sheet overwrapping materials in wide commercial usage, waxed paper and cellophane, were used. Water-vapor penetration of these

Placing bags of anhydrous calcium chloride desiccant in paperboard containers prior to overwrapping and heat sealing.



Impairment of coatings by machine heat sealing. Extent is shown by dark areas due to the deposition of starch iodide.

TABLE I—Water-Vapor Penetration Through Overwraps
(weight increase—grams/sq.meter/day)

	Waxed Paper*			Cellophane*		
No.	Controls,** grams	Single wrap, grams	Double wrap, grams	Controls, grams	Single wrap, grams	Double wrap, grams
1	1.0	62.3	13.8	2.2	11.3	3.1
2	1.1	63.8	13.2	2.1	12.8	3.5
3	1.9	47.0	12.9	2.6	13.2	2.9
4	0.8	52.1	12.9	2.8	7.0	3.0
5	0.3	51.2	12.5	2.1	6.6	2.9
6	...	55.4	11.3	...	6.8	3.2
7	...	80.0	12.8	...	16.7	3.1
Av.	1.02	58.8	12.8	2.36	10.6	3.1

* Calculated to total package area (1¾ in. × 4 in. × 5 in. = 0.048 sq.m.).
** Determined by vapometer (TAPPI method).

materials was determined by means of a desiccant under controlled conditions of temperature and humidity.

Materials Used

The waxed paper was a 25-lb. bleached sulphite paper waxed on both sides to a final weight of 37 lb. per ream with paraffin having a melting point of 135 deg. F. The 300-gage cellophane employed was the anchor-coated, heat-sealing, moisture-resistant type. Overwrapping and sealing procedures were carried out under actual commercial operating conditions in a frozen food plant.

The paperboard containers were the common commercial "trunk" opening type with a capacity of 12 ounces. Four 3/16-in. holes were punched in the top and bottom of each container in diagonal positions. The holes were used to minimize the barrier effect of the paperboard container itself and thus permit the appraisal of the overwrap *per se*.

The desiccant employed was 8-mesh anhydrous calcium chloride contained in cheesecloth bags fashioned from squares of the fabric and tied with string. One bag containing 86 g. of the desiccant was placed in each container. The overwrapping operation was performed by automatic wrapping and heat-sealing machines. Temperatures of the heat-sealing shoes of the wrapping machine were determined and adjusted with the aid of a surface pyrometer.

Based on previously conducted experiments* an optimum sealing temperature of 300 to 325 deg. F. was utilized in machine sealing the waxed paper. As the average heat-sealing cellophane was previously found to seal most reliably at 285 to 300 deg. F.,[4] this was adopted as the sealing shoe temperature for this sheet.

After the packages were machine sealed, they were weighed to + or −0.1 g., placed in the testing tunnel and water-vapor penetration determined according to the TAPPI method.[5] "Control" determinations were carried out by this standardized procedure but with the use of a specially designed test dish similar in construction to the General Foods Corp. test dish.[6] Conditions of the method were slightly modified, in that the average temperature in the tunnel was regulated to 87.5 deg. F. and the relative humidity was maintained between 85 and 90 percent.*

Seven determinations were carried out in the case of the overwrapped packages, each of which was weighed daily to ascertain the weight increase per package per day. Control determinations were made in quintuplicate. Table I shows variations of the weight increases in each set of determinations. The bar chart (Fig. 1) summarizes the results obtained.

* A test to permit a comparison of these results with efficiencies at low temperature storage conditions is being contemplated.

Starch-Iodide Test For Porosity

As the application of heat and pressure to heat-sealable materials results in varying degrees of impairment of water-vapor resistances, a means of visually demonstrating the extent of the changes was devised. The method is based upon the fact that unimpaired coatings of paraffin or lacquer shed water or aqueous solutions while heat-modified areas rapidly absorb water. This condition permits the deposition of blue-black starch iodide in areas which have been modified as the result of heat-sealing.

The method of conducting this demonstration is as follows: the heat-sealed wrapper is carefully removed from the package and passed through a 1.0 percent aqueous iodine solution. This treatment results in the absorption of small amounts of iodine by the heat-modified absorbent areas. After washing with water to remove the excess iodine from the non-porous area, the wrapper is then dipped in a freshly prepared 1.0 percent starch solution. Deposition of blue-black starch iodide takes place in the absorbent areas. The test demonstrates that approximately 50 percent of the surface of a machine heat-sealed overwrap is affected by the automatic wrapping operation, influencing the barrier value.

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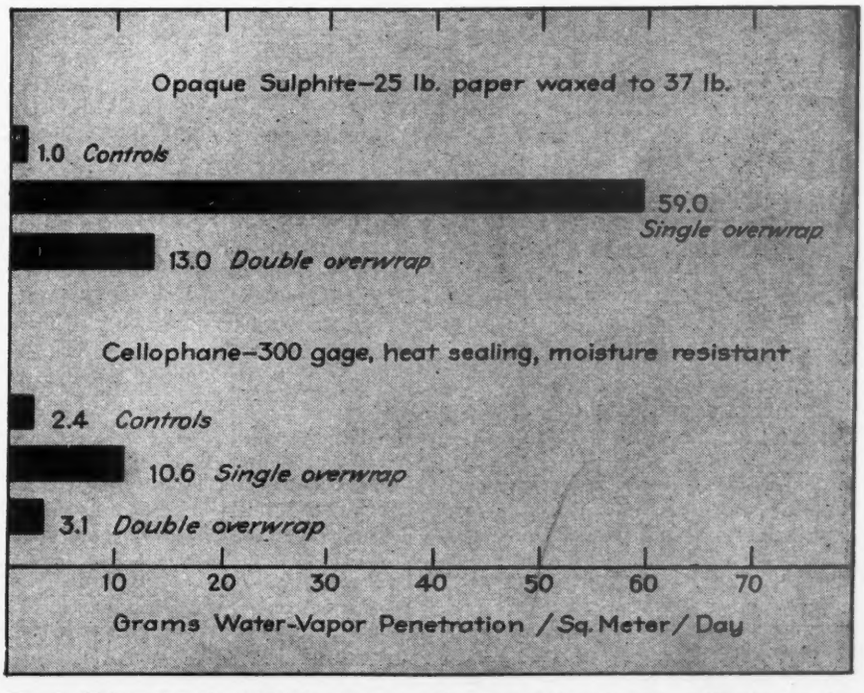
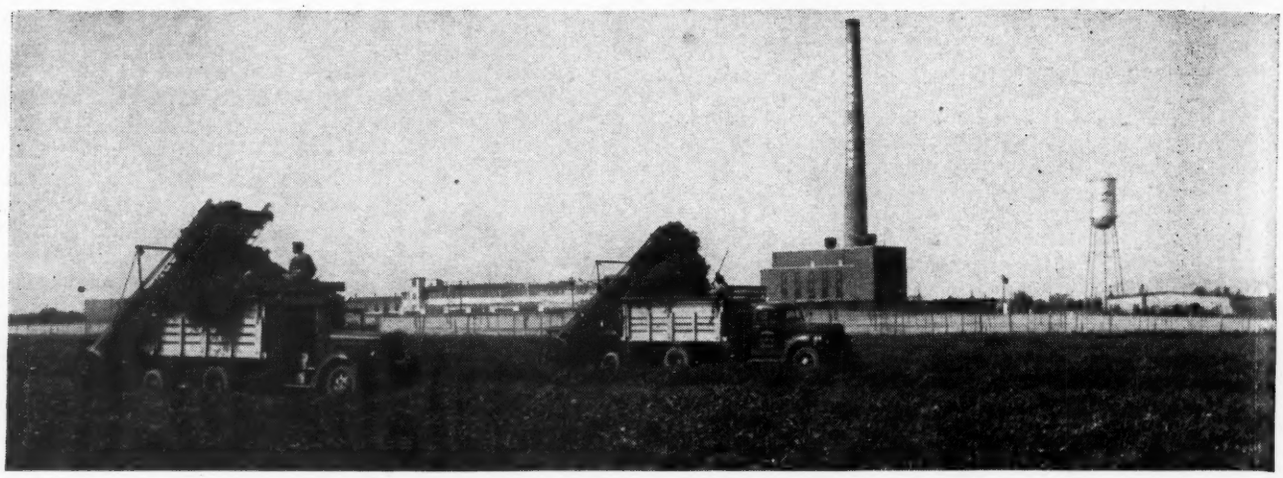


Fig. 1. Moisture-vapor resistance is increased with double overwraps. Results are by TAPPI method and calculated to total area (1¾ in. x 4 in. x 5 in. = 0.048 sq. mi.).



Pea harvesting at Deerfield Packing Corporation-Seabrook Farms. The new power house in the background was constructed in 1944 to take care of the additional steam requirement brought about by the enormous expansion of freezing operations during the war.

Feed-Water Treatment At Deerfield Packing Corp.

By successive treatments, well water containing 30 to 40 parts per million of calcium and magnesium hardness is reduced to zero hardness, and by deaeration, dissolved oxygen and carbon dioxide are reduced to low limits

By THOMAS MARTIN, Chief Operating Engineer
Deerfield Packing Corp., Bridgeton, N. J.

INCREASED food processing during the war necessitated the construction of a new power plant in 1944 at Deerfield Packing Corporation.* To aid in the expansion plans the United Engineers & Constructors, Inc., Philadelphia, were retained to supervise the construction. Two oil-fired boilers were installed with provision for a third to be added at a later date. Provision was also made for future installation of coal-burning equipment including coal and ash-handling equipment.

Modern instrumentation is used throughout to aid the watch engineers. A system of audible and visual alarms is installed to indicate various abnormal conditions prior to the development of difficulties.

The steam is used almost exclusively for cooking and blanching seasonal vegetables. Because of the distance from the power plant to the processing buildings, and the fact that most of the steam is utilized in direct contact with the vegetables in blanching, no condensate is returned to the boiler house. Arrangements are being made, however, for returning all suitable condensate. At present the feedwater conditioning system furnishes 100 percent of the boiler feed requirements. Exhaust steam at 4 lb. per sq. in., from the turbine drives of the water pumps is returned to the deaerating feedwater heater. Also 4-psi. steam is recovered from the concentrated continuous boiler blowoff water in a flash tank for utilization in the deaerating heater. The continuous blowoff system aids in preventing carryover and eliminating the possibility of contamination during direct contact of vegetables with the steam. The remainder of the deaerating heater steam is supplied from the high-pressure main through a diaphragm-controlled pressure reducing valve. A multiport relief valve on the deaerating heater inlet is set to relieve pressure at 8-psi. The remainder of the concentrated boiler water leaving the flash tank is passed through a heat exchanger on its way to the sewer and in so doing raises the incoming feedwater temperature about five degrees.

Raw water, with 30 to 40 parts per million of calcium and magnesium hardness, is pumped from wells into a concrete storage basin having a capacity sufficient for about an hour of operation. From this point the water is pumped to two sodium exchange carbonaceous zeolite softeners. Provision has been made for the further instal-

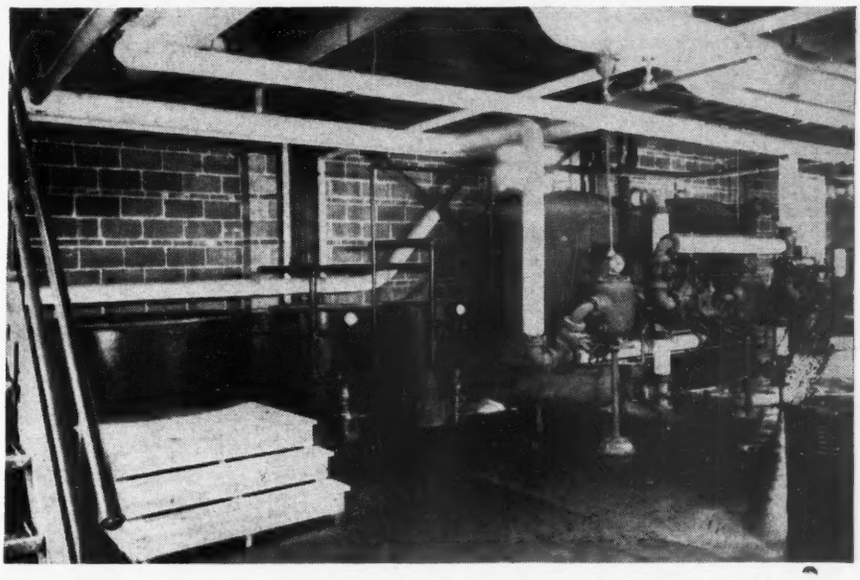
* Seabrook Farms, owners of Deerfield Packing Corp., process vegetables from approximately 50,000 acres in southern New Jersey. During the 1945 season 65,000,000-lb. of vegetables were frozen and a lesser amount canned.

lation of a third unit when additional boiler capacity is installed. The individual softeners operate for about two days between regenerations. Differential pressure gages are provided to indicate the resistance of the zeolite bed, and a flowmeter alarm, attached to each softener, can be adjusted to call the watch engineer's attention when sufficient water has been treated to exhaust the capacity of each softener. This is currently set for 190,000 gallons. A horn and a signal light on the boiler control panel indicate when this flow has been reached. Exhaustion of the zeolite exchange capacity is then confirmed by testing the hardness of the feedwater with a standard soap solution. Hardness and other qualities of the raw water vary widely from time to time.

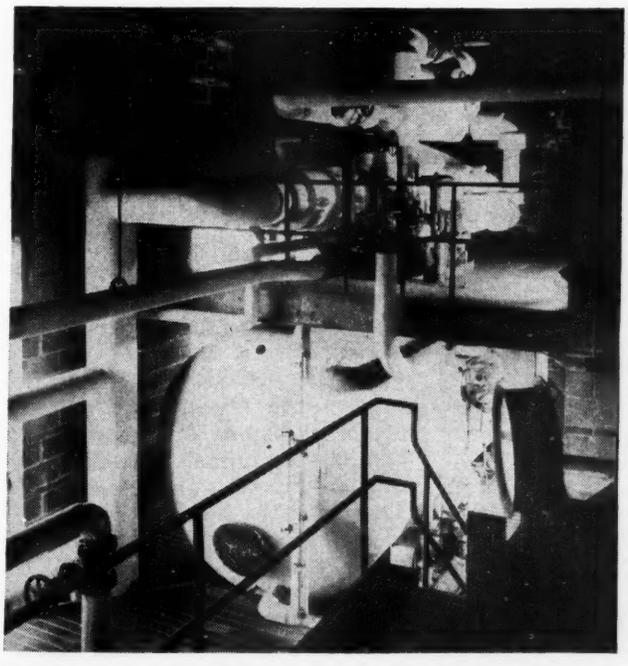
Both units are equipped with single control valves for simplification of the backwash, regeneration, and rinsing operations. The backwash period runs about 10 min. and is controlled by a visual inspection of the effluent. When the backwash water is clear the softener is adjusted for regeneration. In this operation a measured amount of saturated brine solution (26 percent NaCl) is pumped by means of an eductor into the softener as a dilute, 4 percent solution. When the brine tank is emptied the zeolite bed is rinsed to remove the accumulated calcium and magnesium salts and the excess brine solution. This rinsing continues until the effluent, when tested with the standard soap solution, indicates that all accumulated hardness has been rinsed away. This usually requires about 35 minutes. The entire reconditioning operation consumes less than an hour.

Deaeration

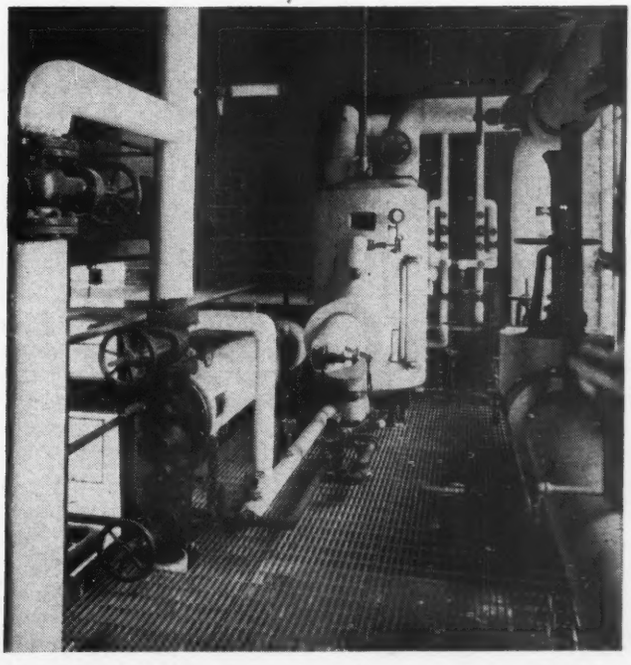
The zeolite-softened feedwater then flows through the heat exchanger, where it absorbs the residual heat of the concentrated boiler blowoff water before passing through the vent condenser and into the deaerating heater. In the deaerating heater, by heat and the mechanical action of flow between staggered trays, the dissolved oxygen inherently present and the CO_2 formed by decomposition of carbonate hardness are removed to low limits to prevent corrosion of piping and boiler tubes. Storage is provided in the deaerator for approximately 50,000 lb. of heated and deaerated feedwater. From the storage tank the feedwater is pumped to the boilers. Sodium sulphite is introduced in the suction line to the feed pump as additional



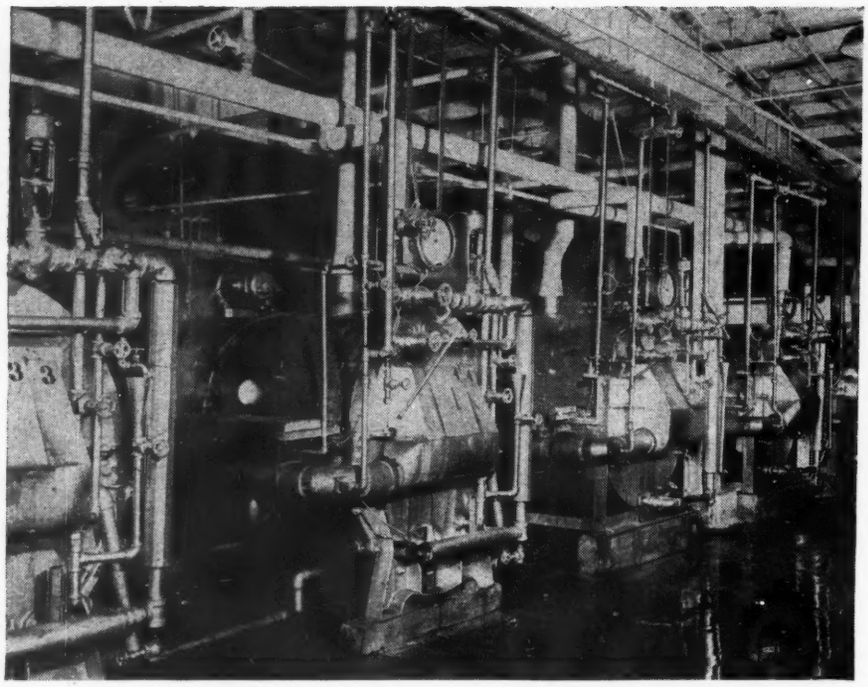
Well water is pumped through sodium exchange carbonaceous zeolite softeners as the first step in the treatment. Salt mixing tank and brine measuring tanks are shown.



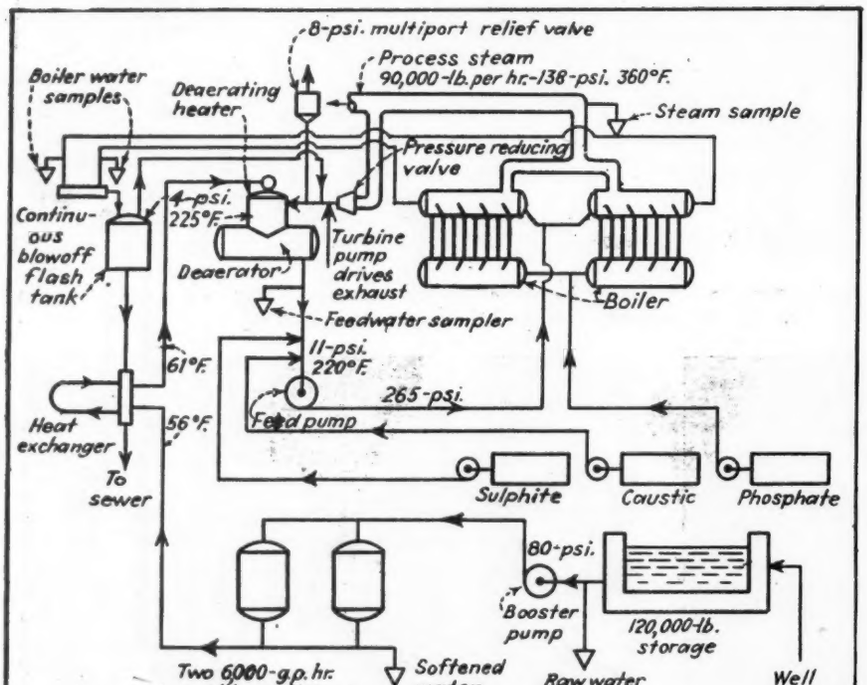
In the deaerating heater the dissolved oxygen, and the carbon dioxide formed in the softeners, are removed to low limits. Storage is provided for 50,000 lb. of heated, deaerated water.



Low-pressure steam is recovered from the continuous boiler blowoff water in the flash tank (shown above). Heat exchanger uses water from flash tank to heat incoming feed water.



In the blanchers vegetables are treated with steam during preparation for freezing. It is important, therefore, that the water used in the boilers be free from minerals.



Flowsheet of boiler feed-water treatment process at Deerfield Packing Corporation.

insurance under abnormal conditions. Caustic soda is added in the same way to increase the alkalinity of the boiler water for further resistance to corrosion.

Supplemental Phosphate

Di-sodium phosphate is fed intermittently to the lower drums of the boilers to produce water of zero hardness. Automatic program timers control this phosphate feed. Water is pumped through the phosphate lines first to eliminate any accumulation of phosphate in the lines and water alone is pumped again at the end of each dosage to clear the lines of phosphate precipitate. Both duration and amount of di-sodium phosphate dosage can be increased or reduced to meet variations in boiler load.

Typical Water Analysis

Raw Water		
pH	4.1	
chloride (Cl)	6.3	— ppm.
hardness as $CaCO_3$	18.0	— ppm.
dissolved solids	37.2	— ppm.
Water from Zeolite Softeners		
pH	5.92	
chloride (Cl)	8.32	— ppm.
free CO_2	17.0	— ppm.
hardness	none by soap test	
Water from Deaerating Heater		
pH	7.0	
bicarbonate (HCO_3)	12.2	— ppm.
chloride (Cl)	7.20	— ppm.
free CO_2	1	— ppm.
free oxygen	none	
hardness	none	
Concentrated Boiler Water		
pH	11.0	
carbonate (CO_3)	42	— ppm.
hydroxide (OH)	158	— ppm.
chloride (Cl)	200	— ppm.
sulphite (SO_3)	25	— ppm.
phosphate (PO_4)	35	— ppm.
total solids	1800	— ppm.
Steam		
pH	6.8	
free CO_2	1	— ppm.
solids	1	— ppm.

Steam And Boiler Water Analysis

Steam flows from the boiler to a 12-in. main leading to the processing plant. Provision is made for sampling the steam from each boiler for the detection of carry-over. Likewise, the concentrated boiler water from each boiler may be individually sampled at the inlet header to the continuous blowoff system flash tank. Lower mud drums are blown down once each day as a routine procedure.

Summary of Results

The value of attentive watch engineers, carefully adjusting power-plant operation to widely varying steam loads, cannot be over-emphasized in our record of efficient steam generation. After one year of continuous service at full boiler capacities, recent internal inspection of the boilers by the insurance company inspectors revealed no evidence of corrosion. Thus is indicated the effectiveness of the deaerating heater in removing the dissolved oxygen and the large amount of carbon dioxide from the feedwater.

The internal inspection further revealed the effectiveness of the softening system, for only a small scum of foreign material was found on the surfaces. This was in the vicinity of the inlet water trough. So slight was the amount that it was not necessary to descale or flush the surfaces before again placing the boilers in service.

It is estimated that the use of continuous boiler blowdown results in a steam saving of 338 lb. per hour, or $4.56 per day.

How German Chocolate Ration Was Made for Wehrmacht

Scho-Ka-Kola, a chocolate tablet with added caffeine, was well made, but it would bloom despite rumors to the contrary. It was neatly wrapped in cellophane by an ingenious machine, then packed in pocket sized canisters

By W. TRESPER CLARKE,* Chief Chemist, Rockwood & Co., Brooklyn, N. Y.

THE German military forces had their ration chocolate as well as the U. S. Forces. It was well made, smooth, tasty, neatly wrapped and packaged. It was nourishing and stimulating, but what we might classify as "drugged." It contained caffeine, as well as roasted coffee beans and kola nuts, both of which are natural sources of caffeine. Such a chocolate ration would hardly be suitable for indiscriminate distribution except to adults. Civilians did not have access to such a food; it went only to the Nazi supermen, the elite who flew the planes, ran the submarines or had special duties where a stimulant was needed. This ration was Scho-Ka-Kola, from the German words Schokolade-Kaffee-Kola, the three principal ingredients-chocolate-coffee-kola.

Germans are fond of chocolate and possibly even more fond of coffee. But, put the two together, and you have a most extravagant luxury. It was a morale builder from the first to the last carefully measured bite. In a relative way these 50 g. discs probably meant as much to the Jerries as a home-made delicacy would have meant to the average American soldier. But relatively few enjoyed them. There simply were not enough to go around, at least not very often.

It is typical of chocolate quality in prewar Germany that only the best would be prepared. German chocolate standards were more exacting and specific than the Chocolate Definitions and Standards of Identity now in effect in the U. S. Rather than add extenders, or substitute something else for cacao beans and make an inferior ersatz chocolate, this ration remained high grade and technically unadulterated to the very end. The formula in prewar years, and until about 1941, was made with an equal mixture of Fermented Accra and Superior Summer Arriba beans. In later war years the amount of cacao beans was reduced and the entire mass was ground more coarsely. The total cacao butter content decreased and the sugar increased thereby resulting in a lighter color and weaker chocolate flavor. However, in 1943 in one plant the blend of beans included

72 percent Fermented Accra
21 percent Venezuela
4.5 percent Java
2.5 percent Superior Summer Arriba

Scho-Ka-Kola was originally a specific recipe. From 1937-39 it contained 52.5 percent cacao substance but by 1945 this was down to 43 percent. A certain degree of leeway was given the two or three remaining manufacturers so that 92 parts of any good chocolate could be blended with 8 parts of the coffee-kola paste, a ratio which seems to have been maintained through the years of its existence. Typical recipes used in 1939 and 1943 are shown in Table I.

Method of Preparing

The prewar chocolate was prepared by a batch method which may seem rather slow to American manufacturers. The Accra beans were roasted for 45 min. at 293 deg. F. air temperature in the Sirocco hot air roaster. The better beans were roasted only 35 min. at 275 deg. F. After removing the shells, the nibs were worked in a stone melangeur for one hour, during which time considerable butter was set free. Powdered sugar was added and, after another 10 min. of mixing the paste was refined on a standard 5-roller Lehmann refiner at a rate of 260 to 275 lb. per hour.

The mass was returned to the melangeur where about one-fourth of the total added cocoa butter was mixed into the paste. After a second refining at a rate of about 225 lb. per hour, the mass was returned to the melangeur and about one-sixth of the butter added and mixed for 15 minutes. The paste was refined for the third time at a rate of about 175 lb. per hour. The paste was then worked in a Lehmann rotary conche at a temperature of 150-160 deg. F. for 60 hours. The conche commonly used held 400 to 440 lb. of chocolate. At the time of filling the conche another small portion of cocoa butter was added, and after about 48 to 50 hr. the remaining cocoa butter was added. At about the 54th hr. of conching, the coffee-kola paste, lecithin, and other flavors that had been mixed and highly refined, were added. The conching was continued for another 6 hr., but at a temperature of 104 deg. F to conserve the flavors of the added ingredients.

TABLE I—Scho-Ka-Kola Recipes.

Ingredients	1939 Lb.	1943 Lb.
Roasted F. F. Accra Nibs.	21.33	28.40
Superior Summer Arriba Nibs	21.33	1.00
Venezuela Nibs	0	8.55
Java Nibs	0	1.78
Cocoa Butter	8.78	1.00
Sugar	40.06	50.63
Kola Paste	8.00	8.00
Lecithin	0.23	0.49
Flavors (Vanillin, ethyl vanillin, etc.)	0.27	0.15
Total	100.00	100.00

* The author was one of the many investigators sent to Germany in 1945 by Technical Industrial Intelligence Committee to learn anything that might be useful to American Industry.—Ed.

Upon completion of the 6 hr. conching, the finished paste was tempered and deposited as tablets in polished tinplated iron molds. These tablets weighed 50 gr. each and were approximately 8 mm. (5/16 in.) thick, and 84 mm (3 5/16 in.) in diameter. They were scored into 8 pie-sections for easy breaking and as a measure of the caffeine dosage. For every 100 lb. of finished Scho-Ka-Kola approximately 84 lb. of cacao beans were required.

By 1945 only two of the chocolate plants in what was left of Greater Germany, are known positively to have been making the ration. Two passages through the refining rolls (at rates of 600 lb. per hr. for the first and 225 lb. per hr. for the second passage) and a total conching time of only 24 hr. changed Scho-Ka-Kola's quality drastically. The amount of cacao beans was only about 58 lb. for every 100 lb. of finished goods, or, expressed in another way, the original 84 lb. of beans must make 145 lb. of Scho-Ka-Kola instead of 100 lb. By the yardstick of relative values, however, this ration tablet was still a luxury to a desperate Wehrmacht which was now hurtling rockets into London and Antwerp, retreating from the West, South and East, ever closer to Berlin and final disaster.

The unique appearance of Scho-Ka-Kola was its roundness, its flatness, the scoring given to the tablet at the time of molding and particularly its wrapper, see Fig. 1. Two tablets made a neat and handy package to fit into the pocket. The 100-g. package was not as big as a sandwich. Both tablets were individually wrapped in "Pergamin," a variety of transparent cellulose paper.

The round canister carton (Fig. 2) holding two tablets was pressed from thin sheet metal, lacquered and neatly printed. An adhesive tape sealed the top and bottom together and provided a dustproof (and allegedly a war-gas proof) container. The canister was packed and sealed by hand. By 1942 more stringent conservation of all metal forced a change to a paper container which was dustproof, but no claims were made for its resistance against water or dampness, much less against war gas. The cellulose adhesive tape held top and bottom together but once opened the package was too loose to stay together.

Scho-Ka-Kola is known to have been prepared in 1936, and it is likely that it was being planned even a year or so earlier. About that year a hand operated wrapping machine was devised, which made it possible to wrap a round disc with a single piece of cellophane, gather the folds on the under side and seal all folds at once with a sticker. A little later an automatic wrapping device was perfected, capable of wrapping 50 to 55 pieces per min. instead of at the slow rate of about three per minute. In 1937-38 the development of the Wehrmacht package was practically completed, and selected chocolate manufacturers were given contracts to make the ration. These plants were licensed to buy machines, to use the recipe and the special compound paste containing the kola, coffee and caffeine constituents in standard prescribed amounts.

A typical thoroughness of plan shows through all the developmental and operational stages of this ration. All Scho-Ka-Kola manufacturers were licensed and required to use the Hildebrandt product made of coffee, kola, caffeine and cocoa nibs. At least one prominent manufacturer showed his ingenuity in duplicating such a paste, but was not permitted to use it in competition with the one company which enjoyed the monopoly. The full details of this paste were not known outside the close circle at Hildebrandt, although it was known to have approximately 30 percent petroleum ether solubles, principally cocoa butter and oils from the coffee and kola. The total caffeine was supposed to be standardized at 2.5 percent, so that when the finished Scho-Ka-Kola contained 8 percent by weight of Hildebrandt paste, it would have 0.20 g. of caffeine per 100 g., or 100 mg. of caffeine per 50-g. tablet.

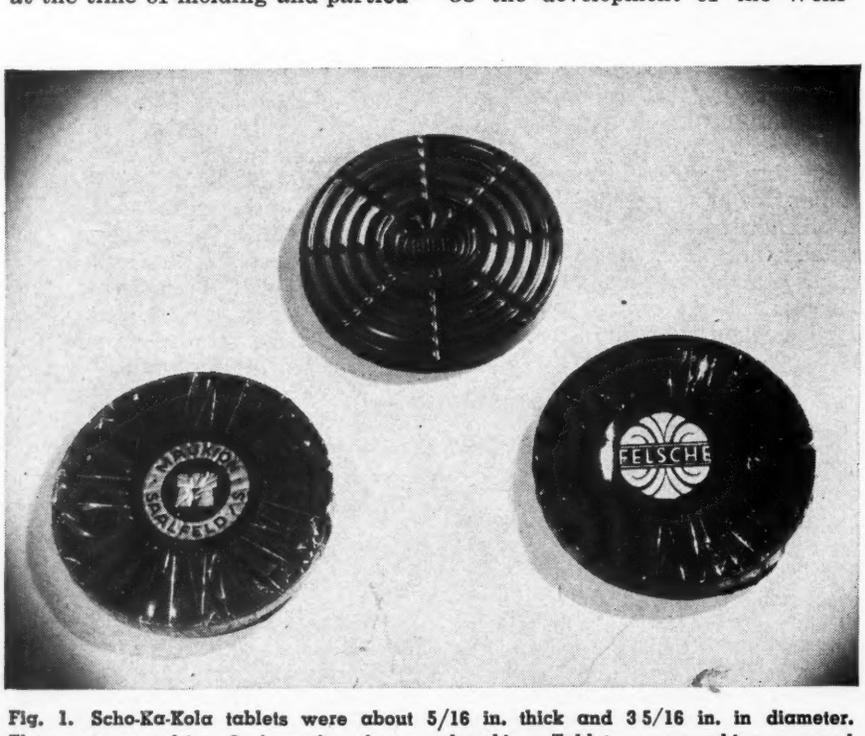


Fig. 1. Scho-Ka-Kola tablets were about 5/16 in. thick and 3 5/16 in. in diameter. They were scored into 8 pie-sections for easy breaking. Tablets were machine wrapped with a single piece of cellophane. The folds were gathered and sealed under a sticker.

Coffee-Kola Paste

The coffee-kola paste was not as finely ground as might have been expected. It contained no sugar. It was a solid which could be converted to a plastic by warming. It could be easily mixed with the other constitutents and thoroughly distributed, refined and conched. Samples of the paste made in 1939 were stronger in coffee characteristics than that made in 1944. We need only suggest that by 1944 coffee was scarce, even for the elite. Scho-Ka-Kola, as far as could be determined, was never "denatured" with ersatz coffee preparations, although it is possible that "second hand" coffee grounds might have found their way into some of the 1944 Hildebrandt paste the writer saw.

The ingredients of Scho-Ka-Kola, with the exception of the Hildebrandt paste, were common and well-known. The paste was one of the products called for by the specifications. There was nothing too mysterious about it. It did not contain special minerals or vitamins. This paste was probably developed by Albert Rinne, a member of the technical staff at Hildebrandt, Berlin. The product was said to be

patented but no one in any of the plants visited was able to produce a patent number or copy of a patent.

However, the product dates from about July, 1936 at which time Rinne and possibly others worked to prepare the paste from coffee, kola, chocolate and caffeine.

Evidence is at hand[1] that work was well under way in late 1935 toward improving the "Armeeschokolade" for the Wehrmacht, although we cannot be positive that from the beginning it was planned to use kola and caffeine. Various recipes using skim milk powder were being considered and tried. Rinne seems to have solved the problem of regulating the introduction of stimulant material in standardized quantities. Nearly four years went by before we find the suggestion that application for a patent was actually made. A brief news item[2], announced that Albert Rinne, Diplom Ingenieur of Hildebrandt, West End Berlin, between the dates of Oct. 25 and Nov. 21, 1940 was granted a patent for his method of manufacturing k o l a chocolate, which had been classified under 53f, 2-(R96749).

Hildebrandt, however, proceeded to manufacture such a product beginning around 1936 and enjoyed a monopoly of its production. It is known to have been sold for use only in the chocolate plants selected to produce Scho-Ka-Kola and no royalty payments were exacted. In appearance it is similar to heavy, coarse chocolate paste, softening around 86 to 88 deg. F, and has the strong flavor of coffee.

Scho-Ka-Kola Would Bloom

Scho-Ka-Kola had no magic properties. It would exhibit fat bloom after being subjected to hot summer conditions. Somehow word had gotten around that this was the fat-bloom resistant chocolate the world had long been waiting for, that this was the ultimate in chocolate that German science had brought forth. Many had felt that when, and if the fat bloom problem was solved it would be by German scientific skill. Unfortunately this was not the case, and the simple truth seems to be that the German chocolate makers, practical as ever, used methodical, common-sense technics already known to chocolate makers the world over.

The chocolate was well made, well ground and refined, conched more than is common in this country, carefully tempered and seeded, carefully molded, cooled, wrapped, packed and stored. Aside from small quantities used on U-boats, the Luftwaffe and in Africa it was used mainly in Europe where the climate is, on the average, cooler than in most of the United States. Under such good conditions it kept well and stayed firm indefinitely. Any careful manufacturer, in any part of the world, can duplicate the product if necessity should demand it. Several individual U. S. manufacturers made as much Army Ration D chocolate in a single year as was made in all the German plants during the entire war, and at considerably lower cost.

Fig. 2. Tablets were packed two to a round container. The original container, (right) was pressed from thin sheet metal, lithographed and lacquered. An adhesive tape was used to seal the top and bottom sections together, providing a dust and gas-proof package. Due to scarcity of metal the container was later made from cardboard (left).

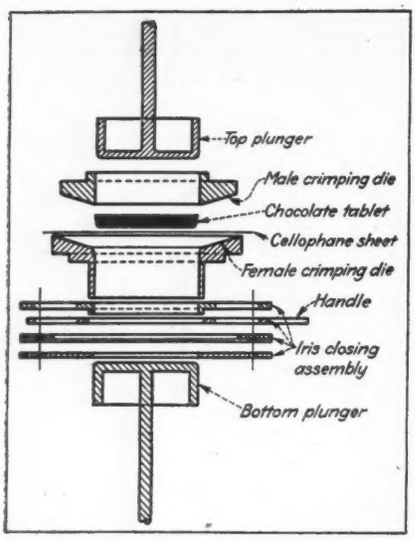
There were several changes in the original list of manufacturers of Scho-Ka-Kola, but the plants known to have produced the ration were: Hildebrandt in Berlin; Felsche in Leipzig; Schoko-Buck in Stuttgart; Fehleisen & Rickel in Hamburg; B. Sprengel in Hannover and Manner in Vienna. The firm of Mauxion in Saalfeld lost its contracts in June 1942 when, it is reported Mauxion wished to produce its own coffee-kola paste, but was forbidden to do so by the Wirtschaftliche Vereinigung. It was variously reported by other German plants that Stollwerck in Köln was at one time a manufacturer, but Stollwerck apparently made other products for the Wehrmacht and made no Scho-Ka-Kola. The firm of Manner was reported to have produced the tablets only after Austria was taken in as part of the Greater Reich. It received the first Loesch wrapping machine sent across the old German borders.

Machine Wrapped

A round, flat tablet or disc presents certain difficulties of wraping since it is a bit awkward to fold and stick down the wrapper. The problem was, however, solved around 1936 when hand operated devices were developed. The principles were successfully adapted to a continuous automatic machine by Max Loesch Co. of Dresden.

Personal investigation indicates that the Loesch hand-operated, single unit machine probably was the first practical device. It consisted of two crimping plates with loosely meshing bevel, ratchet-gear-like teeth, radially disposed to crimp a circular piece of cellophane placed between them. The crimping action takes place when a plunger forces a tablet of chocolate, resting concentrically on a precut circular cellophane sheet, downward through the circular opening in the crimping plates. Such action tends to slide the cellophane through the bevel ratchet gears and make it conform to the design of the crimping plates. The cellophane is formed in vertical folds that turn up to form a cylindrical wall with the tablet on the bottom and inside.

At this stage the chocolate tablet has been plunged downward and



Schematic drawing of the Loesch hand operated single unit machine for wrapping chocolate tablet in precut disk of cellophane. Upper and lower crimping plates form equally spaced pleats in the wrapper. Closing of iris diaphragm then folds cellophane inward. Circular gummed sticker holds pleated ends securely in place.

completely out of the crimping plates, passing into another orifice, which is an iris diaphragm aperture, capable of closing to an opening with a radius equal to about one-half that of the tablet. When the diaphragm closes, the cylindrical cellophane wall turns inward, forms a cone and finally folds down onto the tablet, thereby closing the cellophane folds into an iris-shaped, pleated plane parallel with the tablet face. The operator applies a circular gummed sticker to the center which holds all the pleated ends securely in place so that the diaphragm blades may be opened to release the now-wrapped tablet.

Such hand operated machines continued in use and were seen operating in the Felsche plant in Leipzig. A similar device was seen in the Schoka-Buck plant, this one being made by Verpackungs Automaten G.m.b.H., Düsseldorf. At Mauxion, in Saalfeld, a triple unit device using the same principles but with slight modifications had been made in their machine shops. The Loesch single hand units turned out 3,000 pieces in eight hours with 2 women operators. The cellophane was precut in 7-in. diameter sheets and a printed fancy sticker was moistened and applied by hand.

The same wrapping principles are used in the power driven machine developed by Max Loesch Co. Two rolls of transparent cellophane feed into punch cutting blades which cut circular pieces for the wrapper and sticker. There is a certain unavoidable waste of wraping material and the waste is used as stuffing and wadding in packages. No special grades of "pergamin" are necessary and no special pretreatments of the wrapping material, such as steaming, spraying or moistening, are needed. The wrapper is slipped into place by pneumatic suction cups and held between the crimping plates, while the tablet of chocolate is laid on. The same motions already described for the hand operation then follow and as soon as the crimping and folding are accomplished the wrapped tablet moves horizontally into another section to receive the gummed sticker. The sticker adheres immediately.

Operators required are: A feeder to put the tablets into the feed conveyor; a packer who removes the pieces and a third operator who brushes them gently to remove any tiny flakes or bits of chocolate, changes the wrapping rolls when necessary and sees that the pergamin refuse from the cutting plate is properly collected in the catch box. She also fills the mucilage pots, supplies work material to the feeder and removes finished work from the packer. The packing of two pieces in the metal or paper carton is a separate operation, done by hand. The power driven Loesch wrapping machine had such a great capacity that it supplies work for many hand-packing operators.

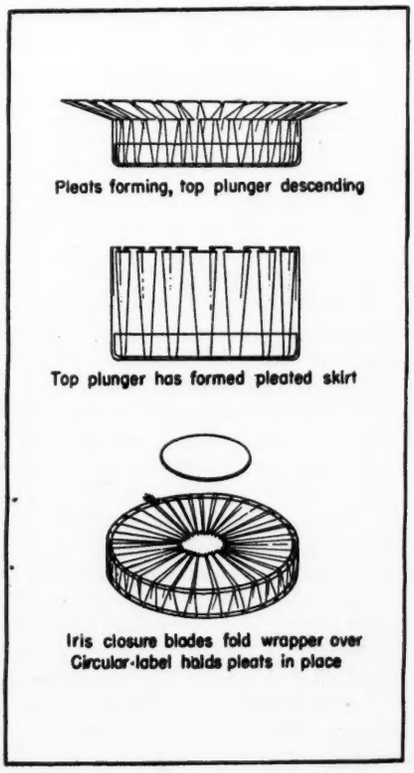
Metal cans or paper cartons were sealed with adhesive tape and dated. The fancy, gathered folds acted as a cushion to keep the two pieces held snugly in the carton. There was rarely any breakage. There was no shifting to cause chipping or dust formation after packing. Samples of ration tablets made in 1937 were in excellent condition. They were as palatable as the latest January, 1945 production.

The Loesch machine is a most interesting device. It would have ready application in the United States wherever fancy wrapping of flat round or oval shapes is needed. It could be adapted to the wrapping of a variety of objects, such as soap, cosmetics, egg-shaped pieces, large or small circular plates, pharmaceuticals, etc. As far as is known neither the hand operated nor power driven device is patented in this country; in fact, no patent seems to have been obtained on these even in Germany. All of the power driven machines bear machine plates referring to a German patent. This is misleading in that it refers to a general device used on many other Loesch machines and obviously does not relate to the unique parts at all[3]. It would appear that under the circumstances the principles are open to further exploitation and development in this country, although possibly without patent protection because of existence of the German machines as prior act or knowledge.

Chocolate is not an indispensable material of warfare. However much we may despise things developed by our enemy for exclusive use by their military forces against ours, without prejudice we must acknowledge the nicety of the Scho-Ka-Kola product, and the co-ordinated efforts of all the people involved. The problem of preparing a food product for the men who might one day be fighting for the Fatherland may have urged the chocolate manufacturers to do their best. When war came this product continued to receive the closest attention of the worker until defeat.

References

1. *Gordian*, 19, Dec., 21, 1935.
2. *Gordian*, 17, Dec., 10, 1940.
3. Deutsches Reich Patent No. 417,766, issued October 25, 1924.


Pleats forming, top plunger descending
Top plunger has formed pleated skirt
Iris closure blades fold wrapper over
Circular-label holds pleats in place

Diagrams show progressive stages in forming the flat cellophane sheet into a wrapper for the Scho-Ka-Kola tablet. The operation can be performed on hand operated machines or on semi-automatic machines. This type of wrapping can be used for other products sold in tablet form.

Super High Frequency Heating For Preparation of Food

Electronic equipment, operating in the radar wave range, defrosts and cooks in a few seconds. Cakes rise as by magic, crust-free and fine-textured. Units will be available soon for commercial use, later for industry and the home

NEWLY perfected heating devices, employing radar generators, are expected to further widen the horizon of electronic processing of food materials. The equipment was demonstrated for the first time last month at a special showing in New York for food editors, home economists, restaurant men and airline operators. It was the consensus of opinion that an important advance has been made in food preparation which the consumer will readily appreciate, and which in due course will have its effect on the food industry. This was the view especially of those familiar with developments in the use of electronic heat for baked goods and for defrosting or cooking frozen foods.

FOOD INDUSTRIES has carried articles from time to time on the use of equipment employing the dielectric heating principle for baking and for the control of molds or for rapid defrosting of frozen food. The new devices differ essentially in the employment of super high frequency radio tubes which operate on wave lengths much shorter than those formerly used for heating purposes.

Generated by Magnetron

Dielectric devices hitherto described have used frequencies of from 13,000,000 to 30,000,000 cycles per second. Now frequencies up to 3,000,000,000 cycles are employed. They are generated by magnetron oscillators, which were developed during the war as the energy sources for radar sets. Where there has been debate in the past as to the most effective frequencies to use, it has now been shown by actual test that these ultra frequencies will do a perfect job of baking cakes or preparing hot sandwiches. They will also defrost frozen, prepared meals and give them their final cooking.

The organization responsible for the new heating equipment is Raytheon Manufacturing Co., of Waltham, Mass., who manufactured magnetrons during the war for their radar sets and microwave communication equipment. They are using the trade name "Radarange" for their high frequency cooking units. Raytheon claim to be the first to apply the radar ultra frequencies to heating problems. One of the advantages is the high concentration possible with the magnetron generator and the gold-plated radar "horn" by which the energy is directed, in much the same fashion that light is beamed. High efficiency of the super frequency is the essence of the heating application. Molecular friction in the food material causes the heating effect, and the action time is measured in seconds instead of in minutes as has been usual hitherto. A metal plate, opposite the radar "horn", is used to reflect and re-reflect energy so that most of it is expended on the material being heated, with energy dissipation held to a minimum.

Used by Airlines

One of the first of the Radaranges was intended for defrosting and heating complete, prepared meals for the airlines, which have been pioneers in the adoption of precooked and partially precooked,

First production units, under the trade name Radarange, are intended for airplane and restaurant use. Removal of side panel from the cabinet reveals the magnetron power oscillator tube, which is akin to the electronic heart of wartime radar equipment.

frozen meals. The "In Flight" Radarange will defrost and heat a frozen meal in less than one minute. Temperature of the meal, consisting of 4 oz. of meat, 2 oz. of vegetables and 2 oz. of potatoes, is raised from 10 deg. F. to 170 deg. F. The aircraft installation includes generators for supplying power, a cooling unit for the magnetron, and a standard frequency generator for the timing control.

Along with the airline unit, Raytheon has produced a Radarange for hotels, restaurants and lunch counters. It has the general dimensions of a medium-sized refrigerator cabinet, which contains the radar generator and accessory electrical equipment, fully automatic in operation and provided with suitable safety controls. Power requirement is 4½ kw., supplied at 60 cycles a.c. with current consumption 40 to 50 amp., or 20 to 22½ amp. on 230 volts. For cooling the power tube, 2 qt. per min. of water at city pressure must be provided. Switches make it impossible to operate the unit if water pressure is inadequate. Self-contained air- and water-cooling units are being designed.

How It Operates

Food is placed in a stainless steel basket approximately 8 in. x 4 in. The basket is pushed under the radar "horn". A timer with a dial calibrated in seconds is set for the proper cooking interval. A button marked, "Heat on", is pushed, and a red pilot light indicates, "Food cooking". The unit automatically turns off, then a green light shows.

Raw hamburger and onion in a bun are cooked in 35 seconds. Grilled frankfurters on rolls are ready in 8 to 10 seconds. Gingerbread and biscuits are baked in 29 seconds. Six pound beef rib roasts are ready to eat in two minutes. Temperature of the aforementioned going into the unit is 40 deg. F., and 200 deg. F. coming out.

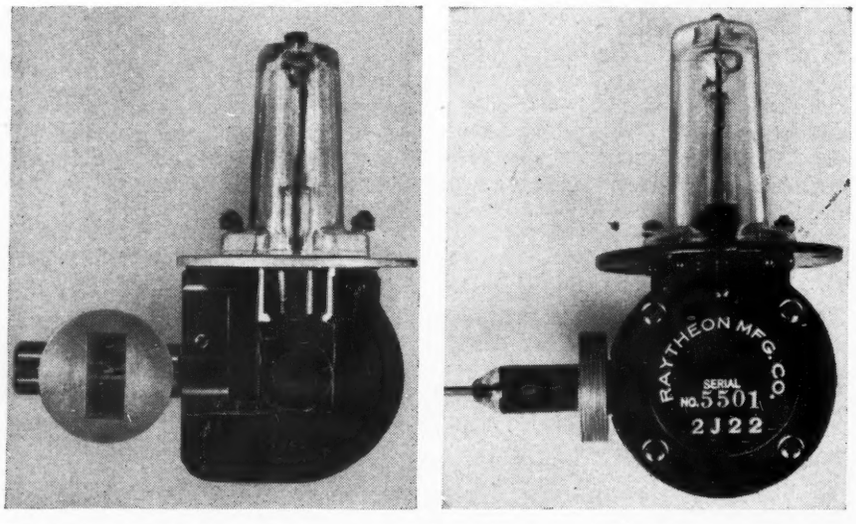
Aside from cooking, baking, roasting and defrosting rapidly, the unit reduces food handling, eliminates waste and increases overall economy. Frozen food stores can employ Radaranges to defrost frozen foods for customers who make purchases for immediate use. Thus, a wait of several hours for natural defrosting can be eliminated.

New Food Creations

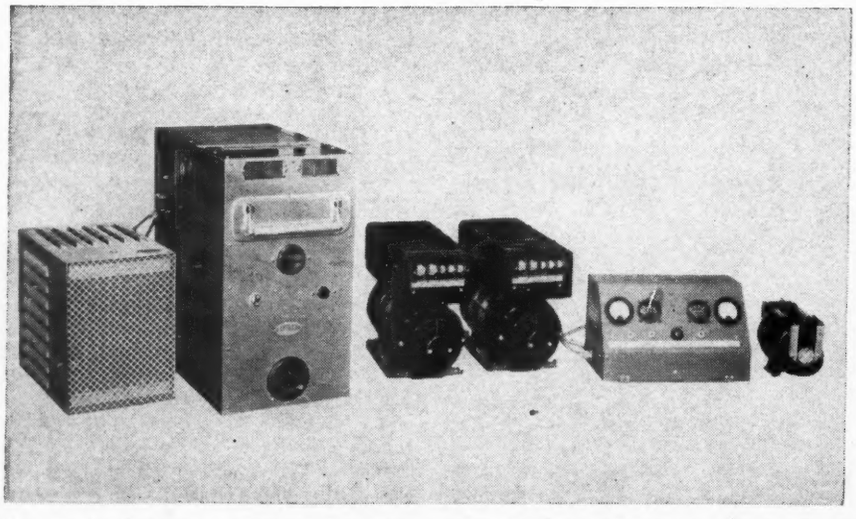
Foods cooked with the unit are different from those cooked by conventional methods. The onion in the hamburger and roll is crisp, white and well-cooked. Gingerbread is light, fine-textured and without crust. Roasts are gray instead of brown, with little surface crust. Precooked frozen foods are thawed and heated almost simultaneously with no further browning.

Enthusiasm for what are virtually new food products was particularly evident among the women attending the special Radarange demonstration. For the industry, there is seen an opportunity to work out new cake mixes and special sandwich creations. The fact that luncheon combinations can be radar cooked while still in their wrappers is an important development from the combined standpoints of prepackaging and improved sanitation. The popularization of high frequency delicacies by public eating places will undoubtedly make a change in food preparation methods, and will accordingly be of significance for the industry.

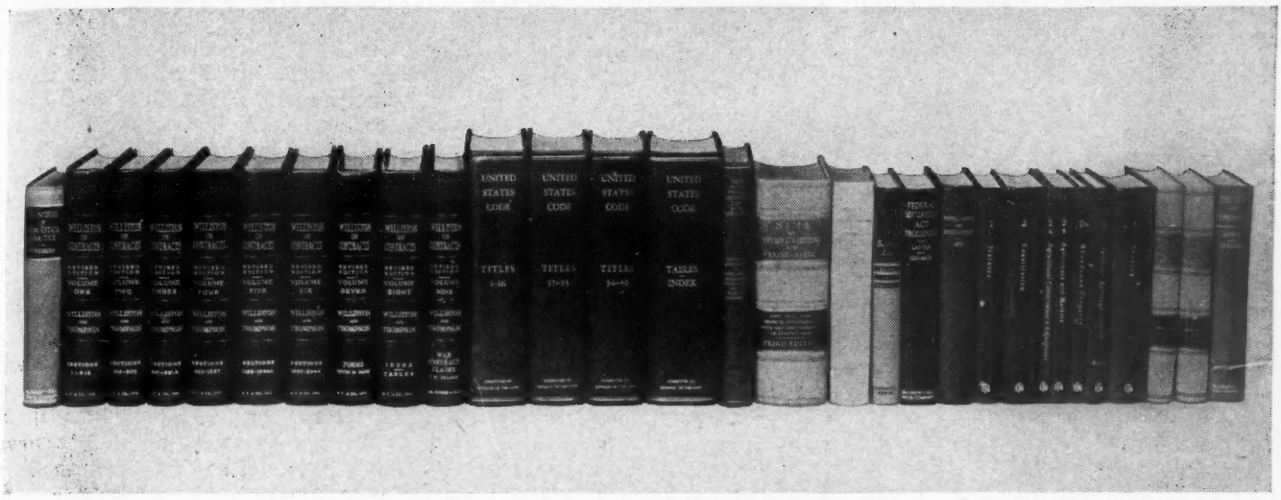
For the time being, however, the equipment will logically be used by the commercial establishment. Production of the models for airplanes and sandwich shops is underway, with deliveries due in 90 to 120 days. Cost is from $1250 to $1800. Whether lease arrangements will be entertained is not known at the present time. The fact that the Radarange is at present expensive is likely to mean that domestic models are for the future, although the present commercial units may be considered for apartment buildings. The needs of industry for large production baking and defrosting units will be considered in due course.



Two types of magnetron oscillator tubes used in radar sets. (Left): Three cm. magnetron tube, capable of delivering peak power of 50 kw. (Right): Ten cm. fixed frequency magnetron oscillator for delivering 300 kw. peak power.



"In Flight" Radarange unit, designed for cooking food in airplanes. (Left to right): Water-cooling radiator, super high frequency heating unit, twin electrical generating units, control panel and generator for control clock.



Formulas and the LAW*

Higher court decisions, such as the two cited here, should prompt the food processor to carefully investigate before changing a formula. The author decries standards so rigid as to discourage healthy progress

By WILLIAM T. WOODSON, Rogers and Woodson, Chicago

THE Federal Food, Drug and Cosmetics Act of 1938 empowers the Secretary of Agriculture to promulgate regulations fixing and establishing for foods a standard of identity. The statute provides as follows:

Scope of Act

Sec. 401. Whenever in the judgment of the Secretary such action will promote honesty and fair dealing in the interest of consumers, he shall promulgate regulations fixing and establishing for any food, under its common or usual name so far as practicable, a reasonable definition and standard of identity, a reasonable standard of quality, and/or reasonable standards of fill of container: *Provided*, That no definition and standard of identity and no standard of quality shall be established for fresh or dried fruits, fresh or dried vegetables, or butter, except that definitions and standards of identity may be established for avocadoes, cantaloupes, citrus fruits, and melons. In prescribing any standard of fill of container, the Secretary shall give due consideration to the natural shrinkage in storage and in transit of fresh natural food and to need for the necessary packing and protective material. In the prescribing of any standard of quality for any canned fruit or canned vegetable, consideration shall be given and due allowance made for the differing characteristics of the several varieties of such fruit or vegetable. In prescribing a definition and standard of identity for any food or class of food in which optional ingredients are permitted, the Secretary shall, for the purpose of promoting honesty and fair dealing in the interest of consumers, designate the optional ingredients which shall be named on the label. Any definition and standard of identity prescribed by the Secretary for avocadoes, cantaloupes, citrus fruits, or melons shall relate only to maturity and to the effects of freezing."

Regulations Bind

The Statute empowers the Secretary of Agriculture to promulgate regulations for carrying out this Statute.

Promulgate, as defined by Webster is "To make known by open declaration, as a decree." Webster defines a decree as "An authoritative order or decision deciding what is, or is to be, done; an edict." An edict is defined as "A public notice issued by official authority; proclamation of a command, law or rule of conduct by sovereign power or competent authority." You get the idea by this time that when the Secretary of Agriculture promulgates regulations they have teeth in them. They are legislative in character and are as binding as though they were in the statute itself.

Committee's Duties

The secretary's first move, in fixing standards for foods, was to appoint a Food Standards Committee. This committee consists of representatives from the Association of Official Agricultural Chemists, the Department of Agriculture and the Association of Dairy, Food and Drug Officials of the U. S.

The duties of this committee are to formulate definitions and standards, both of identity and quality, including fill of container, after

*Paper presented at IFT panel session, 1946 Chicago Production Conference, sponsored by Chicago Technical Societies Council.

"consideration of all the data —analytical and inspectional— deemed to support them."

The committee meets at intervals to review the data which have been established and drafts tentative standards and after public hearings makes its final recommendations.

The Secretary of Agriculture, now the administrator of the Federal Security Agency, enforces compliance with the standards promulgated by proceedings against the product that does not conform, on charges of misbranding. The regulations provide that a product is misbranded if it purports to be or is represented as a food for which a standard of quality has been prescribed by regulations and its quality falls below such standard; unless its label bears a statement, in such manner and form as prescribed by the regulations, that it falls below such standard.

Misbranding Penalty The statute imposes the following penalty for misbranding.

Any person who violates any of the provisions of this Act shall be guilty of a misdemeanor and shall on conviction thereof be subject to imprisonment for not more than one year, or a fine of not more than $1,000.00, or both such imprisonment and fine.

For a second conviction the imprisonment is for three years and the fine is $10,000.00, or both.

How does the Secretary of Agriculture go about fixing the standards of identity of foods? He must hold a public hearing prior to the issuance of a standard for any product. The regulations provide for such hearings as follows:

That the secretary upon his own initiative or upon an application of any interested industry, or substantial portion thereof, stating reasonable grounds therefor, shall hold a public hearing upon a proposal to fix a standard of identity of any food.

Notice of Hearing The notice for such a public hearing is published in an official publication known as the "Federal Register." The usual notice is to the effect that the administrator of the Federal Security Agency, upon his own initiative and in accordance with the provisions of the Federal Food, Drug and Cosmetic Act, will hold a public hearing giving the date, time and location, for the purpose of receiving evidence upon the basis of which regulation may be promulgated, fixing and establishing a definition and standard of identity for each of the foods named in the caption of the notice.

The notice goes on to say that the interested persons are notified that the hearing is a fact finding proceeding to determine definitions and standards of identity for the foods designated in the notice. The notice then sets out a tentative definition and standard for the product. It is stated in the notice that: "It is not to be inferred from the fact that proposals are made that they represent the views of the Federal Security Agency or that the evidence to be adduced by the Agency will support each proposal."

There are then set out in the notice definitions and standards of identity for the foods in question, which are suggestive of the type of definitions and standards of identity that may be adopted upon the basis of the evidence received at the hearing. The notice concludes with the statement that: "The suggested definitions and standards of identity are subject to adoption, rejection, amendment or modification, in whole or in part, as the evidence of record at the hearing may require."

Enforcement of Law Now that a standard for a certain food has been fixed, how is compliance with it enforced?

If the administrator, or one of his agents, finds a food on the market that is not labeled in accordance with the standards promulgated, the food is seized and a libel proceeding against the product is instituted on the grounds that the food is misbranded—that is, a condemnation proceeding is instituted. Such actions are in the U. S. District Courts and are entitled United States v. the product in question—for instance, United States v. 95 Barrels of Vinegar.

To illustrate the method of enforcing the standards promulgated by libel proceedings, I will review the case of *United States* v. *306 Cases Containing Sandford Tomato Catsup with Preservative*, 53 Fed. Supp. 725. In that case the U. S. Marshal, under the direction of the District Attorney for the Eastern District of New York, seized 306 cases of tomato catsup on the ground that it was misbranded. The claimant of the product—that is, the manufacturer—was Libby, McNeill & Libby, and they defended the action, carrying it eventually to the Circuit Court of Appeals.

Libby Fights Case A standard for tomato catsup had been promulgated. The product seized conformed in all respects to the definition and standard promulgated except that it contained in addition one-tenth of one percent of benzoate of soda. The label on the seized product read: "SANDFORD TOMATO CATSUP WITH PRESERVATIVE."

The claimant, Libby, McNeill & Libby, contended that it was not marketing tomato catsup, but was marketing an entirely separate and different product designated as "Tomato Catsup with Preservative." It claimed that no standard had been promulgated for this product and that the product *was* truthfully labeled.

The Canners League of California, of which Libby was a member, had sought to have the standard for tomato catsup amended so as to permit the addition of benzoate of soda as an optional ingredient. Libby contended that the administrator's refusal to permit the addition of benzoate of soda as an optional ingredient had no reasonable basis of fact and that the standard was therefore void.

Government Wins Judge Moscowitz, in deciding the case in favor of the government, in disposing of the defense that the product in question was not tomato catsup, but was tomato catsup with preservative, for which no standard had been promulgated, said (726):

> To give recognition to a distinction such as claimant asserts would be to thwart the entire purpose of the legislation herein sought to be enforced. The Congressional objective, in authorizing the promulgation of standards for foods and requiring compliance therewith is stated in the statute to be to 'promote honesty and fair dealing in the interest of consumers.' Experience had shown that truthful labeling of a product was no protection to the bulk of the consuming public; if a product gave the appearance of being a certain food, the public assumed that it contained only those ingredients which were commonly associated with that food and the label was never consulted. Even a reference to the label might not enlighten a consumer on the nature of unfamiliar ingredients there set forth.

Ingredients Named To remedy this general situation, Congress authorized:

> an administrative officer (originally the Secretary of Agriculture, whose functions in this respect were subsequently transferred to the Federal Security Administrator), either on his own initiative or upon application of interested persons, to determine what ingredients in a particular food would promote honesty and fair dealing in the interest of consumers. When a standard has been promulgated for any food, any product which 'purports to be' or 'is represented as' that food must conform to the standard or it is misbranded

Food standards, growing out of the Food and Drug Act of 1906 and the Food, Drug and Cosmetic Act of 1938, are generally recognized as having contributed heavily to improved and more orderly practices in both the manufacture and the distribution of food. But the Act's broad directives are open to varied and sometimes conflicting interpretations. Many of these difficulties, however, could be avoided if food manufacturers would take full advantage of the hearings that precede all standards promulgations.

—The Editors

and subject to condemnation. That an additional ingredient not mentioned in the standard is non-deleterious is immaterial; the contents of the standard alone must be complied with. That the additional ingredient is plainly set forth on the label is immaterial; the contents of the standard alone must be complied with.

In acting on his own initiative, it was evidently the Administrator's judgment that the promulgation of a standard for tomato catsup would promote honesty and fair dealing in the interest of consumers. After due deliberation being given to benzoate of soda as an ingredient, either in the standard or as a permitted optional, the Administrator's rejection thereof bars the inclusion of that chemical in any food which purports to be tomato catsup. It is not necessary to decide this Court's power to review the Administrator's determination in this respect for, assuming the power, *his decision is held to be correct.* The evidence indicates that the only purpose in adding benzoate of soda is to effect an economy in the cost of manufacture which amounts to approximately 25% difference in consumer price, resulting in a material economic advantage over competitors who achieve the same preservative quality by the use of a greater quantity of sugar, an approved ingredient. This economic adulteration is the very fraud which the statute was designed to combat.

Circumvent Law (727) It requires no extensive argument to reveal the obvious fallacy of claimant's contention that its product is one for which no standard has been promulgated. If every food for which a standard has been prescribed would become an entirely different food by the addition of one ingredient which apparently had no effect upon its taste or appearance, it would be a simple matter to completely evade and circumvent the purpose of food standards.

The evidence clearly shows that the seized product is a food which purports to be tomato catsup, a food for which a definition and standard of identity has been promulgated, and that it does not conform to such standard in that it contains benzoate of soda, an ingredient not approved by the standard. It is therefore misbranded within the meaning of 21 U.S.C.A. 343(g) (1) and is properly condemned.

Higher Court Affirms The Court of Appeals for the Second Circuit, in affirming the decision of the District Court (*Libby, McNeill & Libby* v. *United States*, 148 Fed. (2d) 71 and 72 said:

The sole contention urged upon appeal is that the seized product being truthfully labeled, not deceptively packaged, and sold under a name accurately descriptive of its composition, is not misbranded within the meaning of 403(g), because of the presence in the food of the sodium benzoate.*

The District Court found the product under seizure to conform in all respects to the definition and standard promulgated by the Administrator, except for the addition of the small quantity of benzoate of soda, but held that it purported to be catsup, and so, since it did not conform to the standard, was misbranded. **Decision therefore turns upon the meaning** of the word 'purport' as used in 403(g). The appellant contends that the label is controlling, that its product does not thereby purport to be catsup, even though it conforms in all respects to the standard, except for the added ingredient. It is a specific article, namely, tomato catsup with preservative, and since its label truthfully so indicates, there is no misbranding. The label may be disregarded only if it is assumed that 403(g) expresses an intent on the part of the Congress to outlaw the manufacture of foods not conforming to applicable standards, which, but for the standard, would be sold under the same common and usual name.

It is impossible for us, in the light of controlling authority, to accept the contention. The condemned food is tomato catsup, and purports to be tomato catsup. If producers of food products may, by adding to the common name of any such product mere words of qualification or description, escape the regulation of the Administrator, then the fixing of a standard for commonly known foods becomes utterly futile as an instrument for the protection of the consuming public.

(74) The argument that an affirmance of the decision below will prevent the development of new foods and 'lay a dead hand on progress' is one that may more appropriately be addressed to the Administrator or to Congress than to the courts.

We thus have a decision from a court, second only in authority to that of the Supreme Court of the United States, upholding the administrator in condemning a product as misbranded when it did not literally comply with the standard that had been promulgated.

The authority of the administrator and the constitutionality of the act was tested in another historical case, by a different route, at about the same time as the *Libby* libel proceedings.

The statute provides for a judicial review of any order promulgated by the secretary, by filing a petition in a United States Circuit Court of Appeals within ninety days after the issuance of such an order.

Quaker Oats' Farina The Quaker Oats Co., filed such a petition for a review of an order of the Federal Security Administrator promulgating regulations fixing and establishing definitions and standards of identity for farina and enriched farina. The petition was filed in the U. S. Circuit Court of Appeals for the Seventh Circuit. The case is entitled *Quaker Oats Company* v. *Federal Security Administrator*, 129 F. (2d) 76.

The court held that the administrator, in promulgating the regulations in controversy, went beyond his statutory authority, and set aside the order.

The standard defined farina as:

. . . the food prepared by grinding and bolting clean wheat, other than durum wheat and red durum wheat, to a prescribed fineness, with bran coat and germ removed to the extent that the percentage of ash in the final product, calculated to a moisture free basis, does not exceed .6 percent.

Enriched farina was defined as:

. . . conforming to the standard fixed for farina, except that it contains prescribed minimum quantities of vitamin B_1, riboflavin, nicotinic acid, and iron. Enriched farina, under the Administrator's standard, may contain as optional additional ingredients vitamin D, calcium, wheat germ, and disodium phosphate.

The petitioner had, since April, 1932, sold its product, labeled on the front panel of the package "Quaker Farina Wheat Cereal, enriched with vitamin D." or "Quaker Farina enriched by the Sunshine Vitamin." During this period it had sold millions of packages annually and its product had a national reputation.

Set Aside Order I quote some excerpts from the court's opinion in setting aside the administrator's order:

(78) While there is some disagreement as to the contested issues involved, we think they may be fairly summarized by petitioner's contention, disputed by respondent, that each of the regulations is unreasonable, that they do not promote honesty and fair dealing in the interest of consumers, and are not supported by substantial evidence. Furthermore, it is contended by petitioner that respondent was without authority to promulgate a regulation concerning enriched farina which had not been marketed theretofore, that the notice of the hearing did not purport to authorize the reception of evidence concerning such standard and that, as a matter of fact, evidence was not received pertinent thereto. It is also contended with respect to both standards that respondent, in administering the Act, has reached an unconstitutional result.

All of the findings, label as such, as well as respondent's argument before this court, are bottomed upon the premise that the standards in controversy are authorized because they are in the interest of the consumer. As stated in his brief: 'The real issue, of course, is whether the re-

*"Sec. 403. A food shall be deemed to be misbranded—

"(g) If it purports to be or is represented as a food for which a definition and standard of identity has been prescribed by regulations as provided by section 401, unless (1) it conforms to such definition and standard, and (2) its label bears the name of the food specified in the definition and standard, and, insofar as may be required by such regulations, the common names of optional ingredients (other than spices, flavoring and coloring) present in such food.

"(k) If it bears or contains any artificial flavoring, artificial coloring, or chemical preservative, unless it bears labeling stating that fact:".

quirements of the regulation are reasonably related to the promotion of consumers' interests.'

(82) Looking at the realities of the situation, it is difficult to perceive how consumers' confusion, resulting from the truth as to the ingredients of a product, could support an action to promote honesty and fair dealing.

(83) In the instant situation, however, there is nothing about the appearance of the product facilitating fraud upon the consumer. True, as the record discloses, plain farina, petitioner's farina and enriched farina are indistinguishable in appearance and taste. Petitioner's product, however, is in no sense a substitution, an imitation, or injurious to health.

Honesty Not Promoted We have not overlooked respondent's argument that courts will not substitute their judgment for that of an Administrative Agency on the wisdom or expediency of a determination within its jurisdiction. There is no occasion to cite or comment upon cases cited in support of this argument. We do not take issue—in fact, we agree. The rule, however, is of no benefit to respondent in the instant situation because, as we have endeavored to show, the regulations, while purporting to be in the interest of consumers, do not promote honesty and fair dealing in their behalf. On this statutory requirement, essential to respondent's authority to act, the record is wholly deficient. In view of this situation, the action of respondent, in promulgating the regulations in controversy, was beyond his statutory authority. Such being the case, they must be set aside.

The situation now looked most favorable for the Quaker Oats Company, but it had the United States Supreme Court yet to deal with.

Supreme Court Decides A petition for certiorari was filed by the administrator in the Supreme Court of the United States for a review of this decision. The petition was granted, the case was reviewed and the decision was reversed. The case is entitled "Federal Security Administrator v. Quaker Oats Co., 318 U. S. 218." The case was decided March 1, 1943. The opinion was written by Mr. Chief Justice Stone. Mr. Justice Murphy and Mr. Justice Rutledge did not participate and Mr. Justice Roberts did not write a dissenting opinion, but stated that it was his opinion that the judgment of the Court of Appeals should be affirmed.

I quote some significant statements from Mr. Justice Stone's opinion (220-221):

The question is whether the regulations are valid as applied to respondent. The answer turns upon (a) whether there is substantial evidence in support of the Administrator's finding that indiscriminate enrichment of farina with vitamin and mineral contents would tend to confuse and mislead consumers; (b) if so, whether upon such a finding, the Administrator has statutory authority to adopt a standard of identity, which excludes a disclosed non-deleterious ingredient, in order to promote honesty and fair dealing in the interest of consumers; and (c) whether the Administrator's treatment, by the challenged regulations, of the use of vitamin D as an ingredient of a product sold as 'farina' is within his statutory authority to prescribe 'a reasonable definition and standard of identity.'

(227) The Act does not contemplate that courts should thus substitute their own judgment for that of the Administrator."

While under that section the Administrator's regulations must be supported by findings based upon 'substantial evidence' adduced at the hearing, the Administrator's findings as to the facts if based on substantial evidence are conclusive.

The review provisions were patterned after those by which Congress has provided for the review of 'quasi-judicial' orders of the Federal Trade Commission and other agencies, which we have many times had occasion to construe. Under such provisions we have repeatedly emphasized the scope that must be allowed to the discretion and informed judgment of an expert administrative body. . . . These considerations are especially appropriate where the review is of regulations of general application adopted by an administrative agency under its rule-making power in carrying out the policy of a statute with whose enforcement it is charged. . . . Section 401 calls for the exercise of the 'judgment of the Administrator.' That judgment, if based on substantial evidence of record, and if within statutory and constitutional limitations, is controlling even though the reviewing court might on the same record have arrived at a different conclusion.

(231) Stated in another form, the argument is that it is unreasonable to prohibit the addition to farina of vitamin D as an optional ingredient while permitting its addition as an optional ingredient to enriched farina, to the detriment of respondent's business.

Lower Court Overruled (232) We must reject at the outset the argument earnestly pressed upon us that the statute does not contemplate a regulation excluding a wholesome and beneficial ingredient from the definition and standard of identity of a food. The statutory purpose to fix a definition of identity of an article of food sold under its common or usual name would be defeated if producers were free to add ingredients, however wholesome, which are not within the definition.

(233) Since the definition of identity of a vitamin-treated food, marketed under its common or usual name, involves the inclusion of some vitamin ingredients and the exclusion of others, the Administrator necessarily has a large range of choice in determining what may be included and what excluded. It is not necessarily a valid objection to his choice that another could reasonably have been made. The judicial is not to be substituted for the legislative judgment. It is enough that the Administrator has acted within the statutory bounds of his authority, and that his choice among possible alternative standards adapted to the statutory end is one which a rational person could have made.

The authority of the administrator to promulgate standards has now been adjudicated by the highest court of the land, and the administrator's power to seize and condemn a product as misbranded that does not strictly comply with the fixed standards, has been upheld by the second highest court in the land.

The significance of the above decisions is that manufacturers must conform strictly to the standards fixed by the administrator. They dare not make their products any better nor any worse than the standards prescribed, it must be "just as good as" and not vary one iota from the fixed standards.

Of course no one criticizes standardization of foods where it is necessary to prevent adulteration of foods by adding poisonous or deleterious substances, which would be injurious to the health of the public, and no one criticizes the act where it protects the public from deception by misbranding. No one would criticize the act if it required that the product be of a certain standard of quality but it certainly is dictatorial and not, in my opinion, in the interest of consumers, which is the basis for the act, when the regulations prevent a manufacturer from improving a product and so stating it on the label. The administrator is, in my opinion, laying a dead hand on progress in the food industry when he prevents a manufacturer from going beyond a fixed standard to give the public a better product. This should be encouraged, not discouraged. The government gives a reward indeed —the Congressional Medal of Honor —to one in the armed service who displays courage beyond the call of duty in defending his country. Yet the regulations promulgated under the food standards act, punishes for misbranding a food manufacturer, who has gone beyond his fixed duty in improving his product so that the public is getting a superior food and is being benefitted by the manufacturer's superior skill and research in improving his product.

What a disaster it would be if food standardization ever becomes linked up with that absurd proposal called "grade labeling," which would require that all products be clothed in prison garb like convicts and identified by numbers. These numbers would indicate grades determined by public authority. Such a scheme carried to its logical, or rather illogical, conclusion would imply that private marks of identification—that is to say trade marks —would be supplanted by grade marks imposed by authority. If grade labeling in the food industry should ever come about, and be coupled with standardization of foods, it would indeed lay a dead hand on progress. There would be no incentive for a manufacturer to make a better product than his competitor and identify it as his own. Indeed, he could not do it. And, as a result, the public as well as the manufacturer would suffer.

Better Lighting: Better Work

PART II—Incandescent lamps are advised for receiving and storage areas. Although fluorescent fixtures cost more, they are recommended for high levels of lighting, owing to reduced heating, and economy of operation

By JOHN S. WALSH, Illuminating Engineer
Pacific Gas and Electric Co., San Francisco, Calif.

THE incandescent lamp is a simple device for changing electrical energy into light—a tungsten filament in a glass bulb with a metal base. Just screw it into a socket, turn the switch, and immediately there is light. Incandescent lamps are available in a large number of standard sizes, up through 1,500 watts—clear, inside frosted, white bowl, silvered bowl, and daylight. The lamps are relatively inexpensive and have a life expectancy of 1,000 hours.

Don't use clear lamps except behind white diffusing glass, or for spotlights or floodlights where projection of light is important. If you do, you're bound to get harsh lighting and sharp shadows. And if you look at a lighted bare lamp filament by mistake, there will be "sunspots" in your line of vision for some time thereafter.

Inside frosted lamps diffuse the filament brilliance and reduce both direct and reflected glare or "glint" off bright machinery or wet surfaces. The loss in light output due to the inside frosting is only two or three percent. Frosted lamps, in standard RLM porcelain reflectors (Fig. 1), are usually the best and cheapest solution for lighting container storage and receiving areas. Glare is reduced and shadows softened even more with white bowl lamps, but they are more expensive, less available and less efficient, and consequently not generally recommended by lighting engineers.

Indirect Lighting

Silver bowl lamps, in fixtures designed to cut off neck glare, have been used chiefly for indirect lighting of offices and drafting rooms. With the proper reflectors, they make fine industrial lighting units, producing soft quality illumination. If incandescent lighting is installed for preparation and processing rooms, or for general illumination in grading and sorting rooms, the RLM silvered bowl diffuser (Fig. 2), with silver bowl lamp is very satisfactory. It has low brightness; gives a minimum of reflected glare and specular, mirror-like reflection off tin or glass; provides some illumination on the ceiling, which is very desirable to reduce contrast; and is easy to maintain. Note the special reflector shape for the silver bowl lamp.

Another good incandescent unit for your working areas is the glass-steel diffuser, (Fig. 3). Use a clear lamp; the diffusion is in the enclosing globe. Maintenance is a bit higher due to cleaning the glassware but lamp replacement costs are less. Surface brightness is low and provision is made for lighting the ceiling to avoid the "tunnel effect." If can marks are to be read in your storage areas, either of these diffusing units should be used in preference to the inside frosted lamp in the standard RLM reflector.

If you have very many lighting fixtures to maintain, detachable types are recommended. The entire reflector and socket unit can be removed by giving it a quarter turn, and replaced in the same manner. Best maintenance practice is to purchase a few extra reflectors and, when replacing burned out lamps,

to put in a clean reflector and take the old one down. Wash the reflector in the sink or at the floor level instead of on top of a 12-foot ladder.

Daylight incandescent lamps get their color quality from the blue glass bulbs, which absorb red and yellow rays from the filament. This absorption causes a definite loss in efficiency — about 30 percent. If daylight color quality must be obtained with any appreciable intensity, use fluorescent lamps. Due to several factors, daylight color quality can be obtained from fluorescent lamps about three times as efficiently as with daylight incandescent lamps.

Color Quality

With reference to color quality in lighting, it appears that, with equal foot-candles of illumination on the work, variations in color quality have little or no effect upon clearness and quickness of seeing—except for grading and sorting which are done by color. Consequently, it makes no difference to the eye whether incandescent lighting, daylight, or white fluorescent, is installed.

Fluorescent lighting has made tremendous progress since it was first brought out at the New York and San Francisco World Fairs. It has a number of advantages. The efficiency is high—at least 2½ times the light output for a given wattage, which means reduced operating cost. The light source is large, giving soft illumination—less glare. Fluorescent lamps are relatively cool, which is a distinct advantage for canneries in the San Joaquin Valley and other warm areas. Lamp replacement cost is about the same. There are disadvantages, too. The first cost of fixtures is much greater with fluorescent, perhaps 2 or 3 times as much. And remember that there may be certain operational difficulties with the auxiliary devices in fluorescent lighting units if quality equipment is not used.

The fluorescent lamp is really an electronic device. Very briefly, the present standard or hot cathode fluorescent lamp is a glass tube with two prongs on each end, leading to the terminals of a tungsten filament or cathode. The cathodes are coated with a special material to release electrons when the filaments are heated. With alternating current, the electrons flow from one hot cathode to the anode at the opposite end of the tube, then from the opposite cathode to the other anode. The tube is filled with argon gas to facilitate starting, and is given a minute charge of mercury which vaporizes in the electron stream to produce an invisible radiation, and a small amount of pale blue light. The invisible radiation strikes the phosphors, or fluorescent powder coating on the inside of the tube, to produce visible light, the color of which is determined by the phosphors used.

Stroboscopic Effect

Since there is no electron flow between electrodes as the alternating current reverses direction, there's no light output, except for a carry-over glow from the powders. That is why there is a certain "flicker" from a single fluorescent lamp. Near moving machinery single-lamp fixtures can produce a dangerous "stroboscopic" effect. This hazard can be avoided by using fluorescent fixtures with two or more lamps out of phase or time relation, so that total flicker is minimized and stroboscopic effect practically eliminated.

Fluorescent lamps have two important accessories. There is the starter switch, which first closes an electric circuit through the filaments or electrodes to preheat them. Then the starter switch opens the circuit and the ballast produces an inductive kick that starts the lamp. If the starter switch contacts do not close, the lamp won't start.

The ballast is an inductance which acts like an old fashioned spark coil—it gives an inductive "kick" to start the arc in the lamp. It also limits the current flow. In a well designed fixture, there should be no troubles with the ballast.

An incandescent lamp simply expires at the end of its normal life, the filament gives way and opens the circuit. Fluorescent lamps fail because the active materials on the electrodes have gradually sputtered off on starting—to give those dark rings at the ends of the tubes. As a result, the starter preheats the filaments, then the inductive kick from the ballast flashes the tube, but there isn't enough electron flow to maintain the arc and the lamp goes out. After a while, the starter cools off enough to close its contacts and the cycle is repeated. In the newer type starter switches, with built-in thermal cutouts, the thermal trip opens the circuit to avoid repeated "flashing" of burned out lamps, or the filament glow at the tube-ends due to frozen starter switch contacts. Fluorescent lamp life is dependent more on the number of starts than the burning hours. Under normal conditions, say two starts a day, a fluorescent lamp should last about 2,500 to 4,000 hours. This compares very favorably with 1,000 hours of life for the average incandescent lamp.

Removable Fixtures

Fluorescent fixtures are usually of porcelain enamel, easily cleaned. The standard industrial unit is the two-lamp RLM fixture, (Fig. 4). Fixtures can be chain mounted for local lighting, with a plug into a ceiling outlet. With this arrangement, the whole unit may be taken down for cleaning and lamp replacement. One cannery uses chain hangers, and moves the fluorescent fixtures from one area or conveyor line to another in a different part of the plant when changing from a tomato run to an asparagus run. In this way, the investment in supplementary lighting equipment is kept to a minimum, but there is plenty of light where and when it is needed.

Closed-end fluorescent reflectors have a definite advantage over the

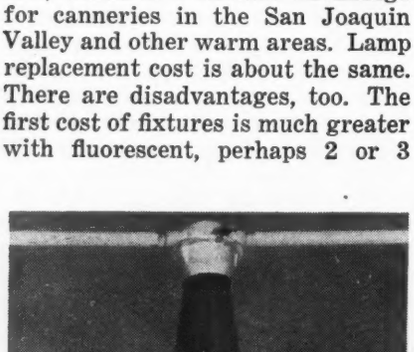


FIG. 1. Frosted incandescent lamps, in standard RLM porcelain reflectors, are the best and cheapest method of lighting container storage and receiving areas.

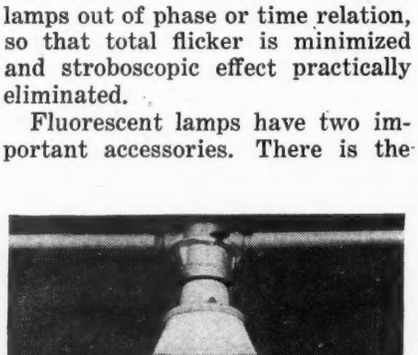


FIG. 2. The RLM silvered bowl diffuser, with silver bowl lamp, is very satisfactory when incandescent lighting is used for preparation and processing rooms.

open end units, and we believe are worth the slight additional cost. A reflector has two functions—one is to redirect the light from the lamp to the working plane, and the other is to provide lamp shielding or cut-off to protect the worker's eyes from direct glare. The open end units do not have this shielding at the ends, and the brightness of a bare fluorescent lamp is still too high for comfort.

Cold Cathode Lamps

Cold cathode lamps are fluorescent sources and put out light in the same manner as the conventional hot cathode type. Instead of a tungsten wire filament at the tube ends, the cold cathode lamps have short metal cylinders or cups, and the electron flow takes place between these terminals. The transformers used with cold cathode lamps are of higher voltage, and their use in canneries is seriously questioned, even when safety precautions are taken. Cold cathode lamps start instantly, without preheating of electrodes, so no starting switches are required. Their main advantage is a longer lamp life, the disadvantage is the hazard to life due to the higher operating voltage. As in the case of the hot cathode lamps, cold cathode lamps must be shielded to prevent direct glare, and placed to avoid or minimize reflected glare and contrast.

Color Quality

Lighting color quality is of vital importance for inspection, sorting and grading. Practically every job has to be studied individually to determine the proper light source. Sorting peaches for degree of ripeness, for example, means passing yellow and discarding green. If the light source is a warm yellow-orange, all the peaches appear ripe. If the lighting is cold blue-green, all of the peaches are apparently rejects. When checking imperfect cuts on sliced peaches, on the other hand, lighting color quality is of minor importance as compared with the amount of illumination. One canner uses fluorescent units over inspection belts, with one daylight and one white lamp to differentiate white from green asparagus, and the same combination for sorting peaches and apricots. He believes that sorting of tomatoes requires warmer light, and uses two white fluorescent lamps per fixture. These may not be the final answers. At this stage we frankly don't know, and further research is needed.

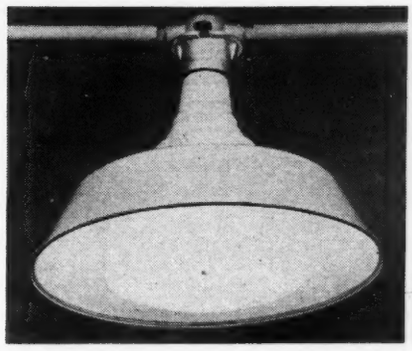


FIG. 3. Another good incandescent unit, to be installed in working areas, is the glass-steel diffuser used with a clear bulb.

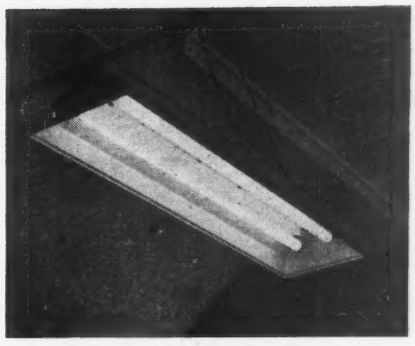


FIG. 4. The standard industrial fluorescent unit is the two-lamp RLM fixture. It is usually porcelain lined and easily cleaned.

Generally speaking, fluorescent lighting is recommended for high levels, of 100 or more foot-candles, with localized lighting over sorting tables, because of the reduced heat and certain economic factors. But there are exceptions. Fluorescent lighting is too soft, too diffused, for sorting corn on the cob. The individual kernels just don't stand out, and some directional lighting and shadows are needed.

Proper Location

As a very rough rule, for general, even illumination of an area, the spacing between fixtures should not exceed the mounting height above the floor. To get the foot-candle intensity needed, the actual spacing and lamp size should be worked out by a competent lighting engineer.

Mounting height should be generally not less than 10 to 12 feet for overall illumination. If units are low, the lighting on the working plane 30 inches above the floor is spotty and uneven. Localized lighting over conveyors should be up out of the line of sight—say 6 feet above sorting tables or belts—but the actual location again will depend on elimination of reflected glare.

As for the choice between incandescent and fluorescent, incandescent is recommended for receiving and storage areas at low levels of about 10 foot-candles. For general lighting in processing rooms at about 30 foot-candles the choice should be made after a cost comparison of the two systems over a period of time. The operating cost of fluorescent is less, but first cost and maintenance are appreciably higher.

Every lighting installation is designed for about 40 to 60 percent more light initially. Fixtures will acquire dust and dirt, cutting down their reflection, and lamps darken and lose their light output with age. A good installation can depreciate to 50 percent or less of its initial illuminating value before one begins to realize that there is something wrong—increased rejects, decreased production, greater number of accidents, more headaches among workers and the like. This is the best reason for having a light meter available in any plant. As a general rule, when the lighting drops to two-thirds of its initial value, the equipment should be cleaned. In some of the dirtier areas, that may mean every two or three weeks. In other areas, a thorough cleaning before the beginning of the "run" or season may be enough.

Cleaning of fixtures is done best by taking the reflectors down to the floor level and washing them with soap and warm water. Porcelain enamel reflectors have essentially a glass surface so alkaline detergents can be used. Watch out for aluminum reflectors, because an alkali will attack the metal. Don't wipe reflectors with a dry cloth when replacing the lamp because the reflector cannot be cleaned by wiping alone, and the grit and grime accumulation after the reflector has been wiped several times in this way forms a permanent coating which cannot be removed.

Replacing of burned out lamps is an obvious duty, and should be done at once by the regular maintenance force. It is also recommended that lamps be replaced when blackened with age even though still burning. You are paying for light which you're not getting. Some plants even use a group lamp replacement plan. In other words, near the end of normal lamp life, all of the lamps are replaced, so that maintenance men aren't dashing around all during a canning run putting in a lamp here, a lamp there

(*Turn to page* 222)

POTATO PEELING METHODS Analyzed and Appraised

Part I—To evaluate actual large scale operation of the important commercial methods of peeling potatoes was the object of a survey for which successful users made available data on 6,000 carloads

By L. CHARLES MAZZOLA, Associate Editor, "Food Industries"

IN the last three years techniques for peeling potatoes have been developed employing fundamentally different principles. To quantitatively compare the results obtained by the more popular commercial methods was the objective of this survey. On evaluating and contrasting actual operating experience on a comparable basis, a definite trend emerged.

Many companies have cooperated in this survey. Requests were made of the sponsors of the various peeling methods for names of well-established companies where the methods were successfully employed. These users were requested to furnish answers to the questionnaire shown in Fig. 1.

At the outset it is important to have in mind the major limitations inherent in a study of this nature. The first is the lack of detailed operating data by the various companies. Most of them do not have it. Next came the great diversity of grades of potatoes used by the various companies, as well as by the same company at different times. The fluctuation in the physical condition of the potatoes was great. An attempt was made to secure reliable information on the solid content of the raw potatoes used by the various companies. This information, however, was sketchy, and in some cases quite unreliable. Few of the companies approached had records of the actual losses in peeling or in trimming, or in both of these operations combined. In many instances the best that could be done was to use the amount of raw stock and the amount of finished product.

Another group of difficulties stemmed from the fact that the methods are not in many cases what the name implies. For instance steam peeling is not just steam peeling, because after the potatoes come out of the peeler they are subsequently put through mechanical peelers with either abrasive or rubber lining. This is also true of brine peeling. This practice may not hold true in all plants in the country using these methods, but it does hold true in the plants which were mentioned by the sponsors of the two methods as being among the most successful users of those methods.

Detailed List of Information Desired on the Peeling of Potatoes

1. State method used; batch abrasive, continuous abrasive, concentration and temperature of lye, flame, steam, concentration and temperature of salt brine, other combinations.
2. The capacity of your line per hour.
3. The cost of your peeling equipment.
4. Depreciation and maintenance charge of peeling equipment (relining abrasive peelers, parts for flame or lye peelers, etc.).
5. Actual tonnage of potatoes peeled over a fairly long period. State period covered.
6. Actual number of pounds of *peeled potatoes* produced from No. 5.
7. Actual number of pounds of *trimmed potatoes* produced from No. 6.
8. Please indicate if 100% trimming job was required for your purpose.
9. Actual labor hours required to *peel* the above.
10. Actual labor hours required to *trim* the above.
11. What grade of potatoes did you use in above period.
12. What state did potatoes come from.
13. From muckland or upland.
14. What principal varieties used in period.
15. Actual cost of materials used, such as lye, salt, chemicals, steam used directly for *peeling* above.
16. The total solid content of raw stock. State how determined.
17. The total solids content of finished product.
18. Actual tonnage of finished product.

Fig. 1. Questionnaire sent to successful users of various methods of peeling.

Conversion of Data

Because the data submitted by the various companies, in some cases by the same company for a different period, included the use of raw stock of different grades, it became necessary to convert the results to an equal basis so that the peeling efficiencies could be comparable. To illustrate: One company reported that it used stock grading only 40% U.S. No. 1. Another company used stock that graded 100% U.S. No. 1. Obviously a greater loss is to be expected from an inferior grade of raw stock regardless of what method of peeling is used. Before comparing the

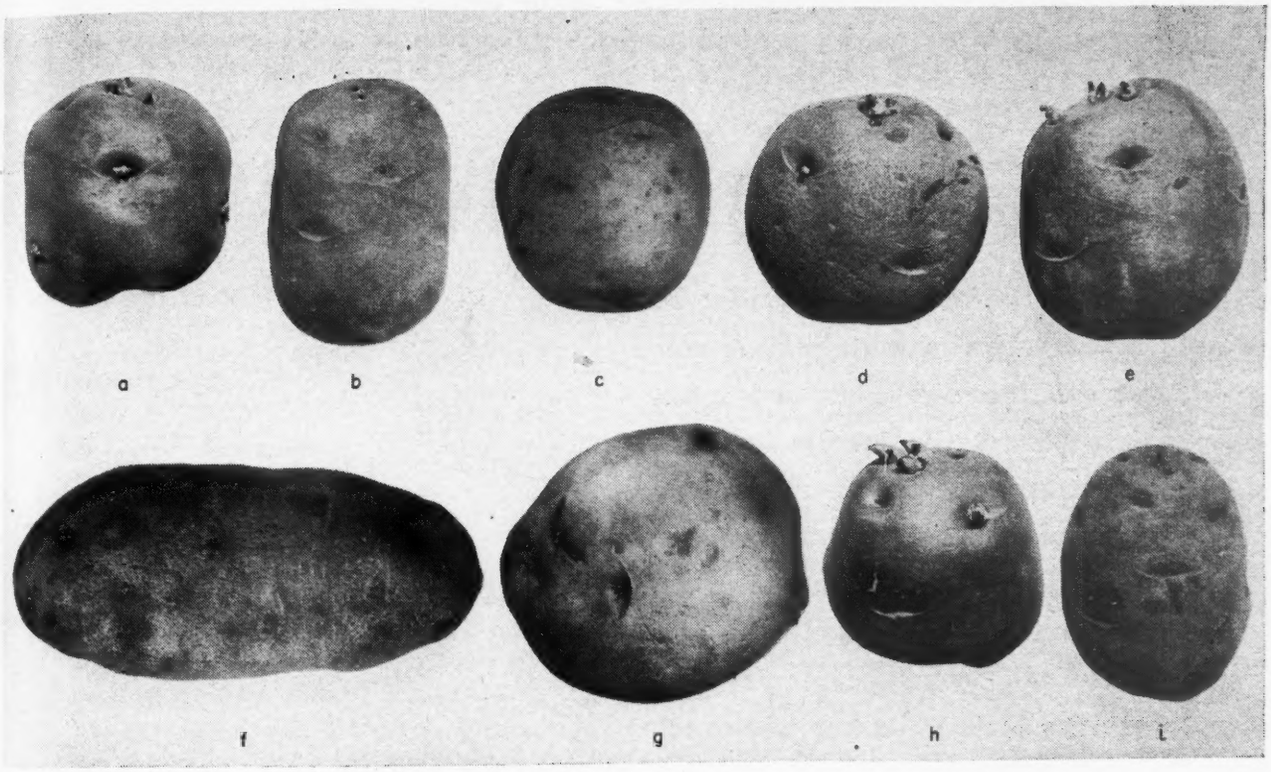


Fig. 2. Major commercial potato varieties: (a) Irish Cobbler; (b) Green Mountain; (c) Katahdin; (d) Rural Russet; (e) Smooth Rural; (f) Russet Burbank; (g) Chippewa; (h) Bliss Triumph, and (i) Early Ohio.

peeling efficiencies due to the method the raw material must be brought to a common basis. In this way any drop in efficiency due solely to the quality of the stock is not included in the efficiency due to the method. For this reason the results reported here are on both a 40% and 100% U.S. No. 1 stock basis. This was done by adopting a formula, considered reasonably quantitative, employing the principle that the part of the total losses due to the condition of the raw stock is proportional to the grades reported.

The foregoing factors are mentioned at the outset, so that the reader will realize that the comparisons made and the conclusions drawn are qualified by these limitations.

The subject will be handled by first attacking the general phases which are common to all methods, and this will be followed by a discussion of each method and how it employs each particular technique to accomplish the objective.

Varieties

Generally speaking the selection of proper varieties is important because of their physical characteristics. Some varieties, such as the Irish Cobbler potatoes, have irregular surface and deep-set eyes (Fig. 2a). For obvious reasons such a potato, regardless of method of peeling used, is not as economical to peel as other varieties having more regular, uniform surfaces with shallow eyes. This variation is progressively accentuated when using mechanical grinding in whole or in part, as a means of peeling. It is especially important to select the proper variety of potatoes if they are to be used for dehydration purposes.

The total solids content is extremely important. This varies a good deal. In this survey it varied from about 15 percent up to 21½ percent.

The methods used to determine the solids content of potatoes varied from plant to plant. In many cases they did not have this information. Parenthetically while all of the plants included in the survey had signed contracts to deliver definite quantities of "solids" at a set price, they purchased "gross" weight, including water "tare" or raw potatoes without knowing what "net" they were paying for. Many of them bought an awful lot of water.

Conditions under which raw potatoes are stored affect the physical as well as the chemical qualities of tubers. The physical condition of the raw stock makes a great difference in the yield of trimmed potatoes, regardless of the method of peeling. One method of peeling produces progressively worse results as the raw stock gets poorer.

Storage Factors

The skin, or periderm, consists[1] of several layers of cells, sometimes a dozen or more, whose walls are infiltrated with suberin—the substance that occurs in all corky tissues in plants. The skin is therefore a corky covering over the potato.

Because of the suberin, the skin of a potato is practically impervious to moisture and air except at the lenticels where the protective layer is a little thinner and less fully suberized than in the intervening areas. Potato weight losses are ten times greater due to evaporation resulting from skin abrasions at harvesting time.

Freshly dug U.S. No. 1 stock produces better yield than the same stock in good storage for 4 months regardless of peeling method used. Stock kept in good storage produces better yield than the same stock in poor storage.

There are three conditions of storage that are critical:

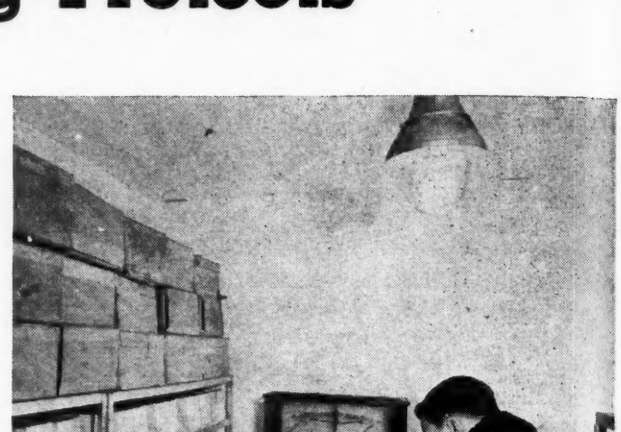
The first factor is proper temperature.[2] Respiration goes on at a rate inversely as the temperature, within limits. It appears that at

(*Turn to page* 224)

Proper Packaging Protects Frozen Meats

Here are some factors to consider in selecting packaging materials. If you employ the right wrappers, you avoid bad freezer burn, minimize surface discoloration, and may improve your product and your package. But proper materials are not enough unless they are efficiently used. Suppliers, if familiarized with your problems, may provide you with valuable assistance

By JOHN V. ZIEMBA,
Assistant Editor, "Food Industries"



Marathon Corp. Photo

Determining protection given by packages against dehydration of frozen meats. Packages are weighed periodically in freezer rooms to determine weight losses that take place due to dehydration in storage.

SELECTION of the proper type of packaging material for frozen meats is vital for maintaining product quality during freezing, low temperature storage, distribution and marketing. Generally, those packaging materials that provide the best protection are the most costly. The packaging laboratory should not be unduly influenced by cost when recommending packaging materials. Where cost is high, however, it is sometimes necessary to test less costly materials. Often times suitable and less costly materials are discovered unexpectedly. It is good practice to contact the suppliers of packaging materials. By advising suppliers of the performance of their materials, they may be able to provide valuable assistance when cost seems prohibitive. Suppliers can often submit less costly materials with certain modifications that do not reduce their functional value. In other instances suppliers, by becoming more familiar with the problem, can submit alternative materials. These may prove acceptable both in cost and performance.

In considering packaging materials for frozen meats, it is important to select only those materials which provide effective protection. Certain salient facts about meat varieties and cuts, together with physical properties of packaging materials, must be known before packaging materials can be properly evaluated by the packaging laboratory. Functional properties of packaging materials vary with the type of material, depending upon whether one employs cellophane, ethyl cellulose, cellulose acetate, polyvinyl films, rubber-hydrochloride films, polyethylene films, wax base papers, vegetable parchment, glassines of various types, metallic foils, kraft papers or laminated papers.

Cold, dry air, enclosed in packaged frozen meats, preserves the quality of properly packaged frozen meats stored in sub-zero freezers. This dry air, however, is a constant hazard to the original freshness, flavor, appearance and nutritive value of frozen meats that are carelessly or improperly packaged.

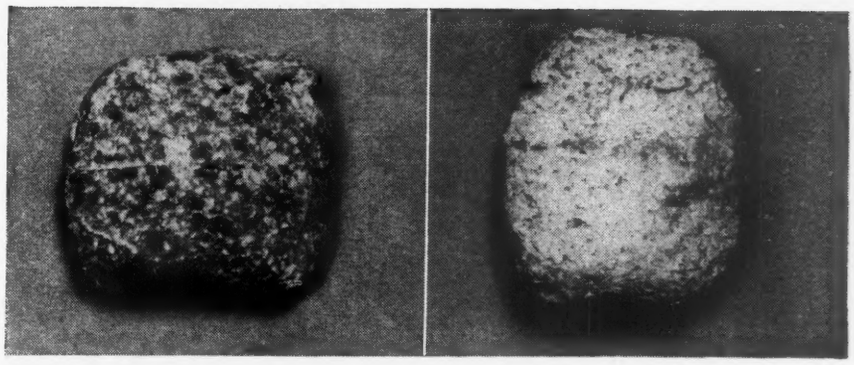
One of the chief factors essential to effective packaging of frozen meats is moisture protection, inasmuch as excessive moisture losses take place from poorly packaged frozen meats held in low-temperature storage rooms. Because of low relative humidities in cold storage plants, excessive moisture-vapor losses occur with frozen meats inadequately packaged or packaged in wrapping materials with high moisture-vapor transmission rates. Dehydration of frozen meats, otherwise known as "freezer burn," begins on the surface and progressively penetrates into the interior of the product. The extent depends upon the length of time in cold storage, temperature fluctuations while in cold storage, moisture-vapor transmission rate of the wrapper and efficacy of packaging and sealing. Frozen meats that are obviously "freezer burned" are not judged top-quality, and must either be sold at a loss or sent to tankage. Where "freezer burning" occurs, frozen meats have a dry, pithy, outer appearance; the flavor is bland or .tasteless; the color is bleached and the texture is dry or coarse or stringy. Prevention of loss of product moisture through packaging materials into the outside atmosphere can be accom-

plished by the use of suitable packaging materials possessing low moisture-vapor transmission rates, proper wrapping and sealing and adequate low temperature storage with minimum fluctuations.

Flexibility Important

To provide close adherence of wrapper to the meat, packaging materials must be flexible. Where close adherence does not exist, air-pockets are formed within the packaged, frozen meat products. These air-pocket areas are undesirable inasmuch as "freezer burning" will occur wherever they are. In selecting a wrapper, it is not only essential that the wrapper possess a low moisture-vapor transmission rate, but also sufficient flexibility to eliminate air-pocket areas within the package. No matter how low the moisture-vapor transmission rate of a wrapper may be, product desiccation will take place within the voids of the packaged, frozen meats with resultant product deterioration and frost accumulation. Moisture-vapor, transmitted from frozen meats packaged in wrappers lacking flexibility, accumulates as frost in air pockets. Accumulated frost within packages bars visibility when transparent films are used. In some instances frost accumulation is so great that the customer observes more frost than product. A customer wants to see the product, not the frost.

Close adherence of wrapper to product and the selection of films with low moisture-vapor transmission rates are not only essential to stop the harmful effects of product dehydration, but also to prevent undesirable oxidative changes as well. The closer the wrapper clings to the product, the smaller are the air spaces within the package. By reducing the amount of air within the package, oxidative changes are minimized. Oxidative changes may produce rancidity and, particularly, surface discoloration. Estimated merchantable life of a packaged, frozen meat item, especially one of a fatty nature, can be extended by use of a smooth, non-porous wrapper with sufficient flexibility to reduce air pockets to a minimum.



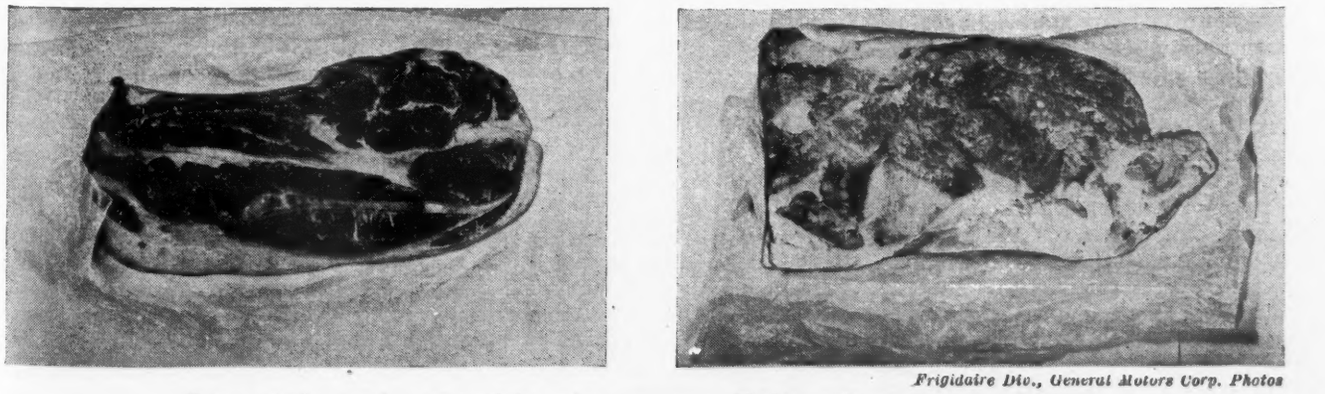
Experiments conducted at the Dept. of Animal Husbandry, Cornell University show the effect of proper and improper packaging of hamburger meat. (Left): Correct packaging. Note the absence of any freezer burn or discoloration. (Right): Improper packaging. Observe the evidence of extensive freezer burn and the dull and discolored appearance.

Workers on the packaging line should make every effort to wrap the paper tightly about products to be frozen, especially in freezers where pressure is not applied to the packaged products during freezing. Where packaged meats, particularly the self-service, retail style packages or rectangular, institutional style packages are frozen in multiple plate freezers, pressure of the freezer plates assures close contact between product and wrapper.

If cartons are used, they must be properly filled. Incompletely filled cartons make undesirable packages, especially where liners are used. Close adherence of the wrapper along the sides of the frozen product is not maintained. Vertical pressure of the freezer plates produces only a close adherence of wrapper to product on top and bottom of the prepackaged frozen meats, but not on the sides. On the other hand, prepackaged meats, frozen in multiple plate freezers with pressure, should not be overfilled in cartons. Over-filling produces distorted packages, despite the fact that wooden spacer sticks are placed between plates to prevent excessive pressure on packages. Distorted packages do not invite consumer acceptance, especially if cartons are broken and the product remains unprotected.

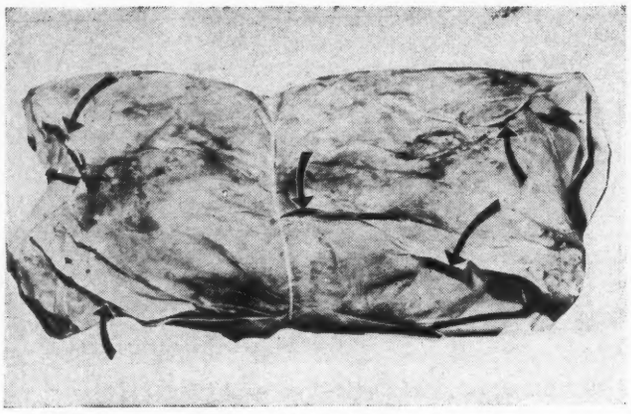
Sealing Properties

Some packaging materials are heat-sealable, others are not. The choice of a packaging material on the basis of its heat-sealing properties depends primarily upon the type of meat to be packaged and the manner in which it is to be merchandised. Large meat cuts, such as lamb legs, beef rounds, beef ribs, pork loins or whole hams, can be heat-sealed, but it has been generally found best to seal the wrapper with sealing tape or to tie with string. The size and shape of the cuts make it difficult to heat-seal wrappers. A lamb leg is an example of an irregular cut that is particularly difficult to wrap and



Frigidaire Div., General Motors Corp. Photos

Frozen steaks can be protected by using wrappers with low moisture-vapor permeability. (Left): Good wrappers stop dehydration. (Right): Freezer burns occur with poor wrappers.



Marathon Corp. Photos

(Left): Here is what may happen to wrappers with no protection against cracking. Creasing and folding of ordinary coated and waxed papers will crack coatings (see arrows) and leave openings. (Right): Wrapper punctures (see arrow) are caused by bones. Each puncture is an opening for moisture-vapor loss. Wrappers should resist breaks, despite irregular shape of meats.

heat-seal. Most institutional size packages are not heat-sealed, either because of the size of the cuts or because large cartons are used in place of wrappers. Products such as kidneys, sweetbreads and brains are generally packed in 5-lb. to 30-lb. cartons containing inner pouches and liners to separate products into layers. Pouches and liners need not be heat-sealable. Self-service, retail style packages are heat-sealed where possible. Smaller size packages are more readily heat-sealed because the heat-sealable area is not extensive.

Transparency

From a retail sales viewpoint, visibility is a desirable feature. This applies to prepackaged, self-service items, purchased by the consumer on the basis of amount of fat and lean in the frozen meat. There is a tendency toward the use of transparent films, provided that adequate protection is furnished. Transparent films make the product "impulse" items. On the other hand, most frozen meats are wrapped in non-transparent material.

Hygroscopicity

Some packaging materials coated with various chemicals, are hygroscopic. They readily absorb moisture from the atmosphere and are undesirable for packaging frozen meats that may be subjected to temperatures above freezing. Frozen meats, packaged in hygroscopic wrappers, accumulate moisture on the surface of the wrapper when exposed briefly to temperatures higher than freezing. This accumulation of moisture on the wrapper may result in a loss in the wet strength of the paper. If there is any notable loss in wet strength, the wrapper tears upon rough handling and becomes unattractive.

Another worthwhile functional property to be considered when selecting packaging materials for frozen meats is durability. For freezing bone-in meats, flexible wrappers must be employed with sufficient wet strength to prevent disintegration of the paper prior to freezing or puncturing of the wrapper by sharp bones in frozen meats during rough handling in freezing, distribution and marketing.

The irregular shape of bone-in meats poses a difficult packaging problem. Wrapper breaks and punctures occur despite careful cutting to eliminate projecting bones.

Another requirement that wrappers must meet is resistance to wear and scuffing due to repeated rough handling. There are coatings and laminations that impart moisture-vaporproofness at ordinary temperatures. But at sub-zero temperatures, they may fracture or break when creased or folded, leaving openings for moisture losses.

Greaseproofness

Many varieties of meat with a high percentage of fat such as hams, pork trimmings, bacons and pork loins are packaged and frozen. Packages used for these meats must be greaseproof in addition to any protection they may provide to inhibit rancidification and dehydration. Excessive grease penetration through a wrapper creates an undesirable, unattractive package with loss of sales appeal. Grease penetrating through wrappers may also make other packages greasy upon contact. Fat rancidification is often accelerated on grease-contaminated wrappers.

Packaging materials, selected for frozen meats, should be very stable with respect to dimensional changes with varying atmospheric humidities. If the type of wrapper selected is a laminate, such as cellophane laminated to kraft or parchment; glassine laminated to parchment; cellophane or cellulose acetate laminated to metallic foils it should also withstand tendencies to delaminate. Waxes and other coatings applied to papers should possess: high resistance to water-vapor transmission, excellent adhesive qualities, flexibility over a wide range of temperature and freedom from odor and taste. Waxes and coatings applied to papers should not become brittle at temperatures ranging from 32 to -50 deg. F. and must not soften at temperatures up to 100 deg. F.

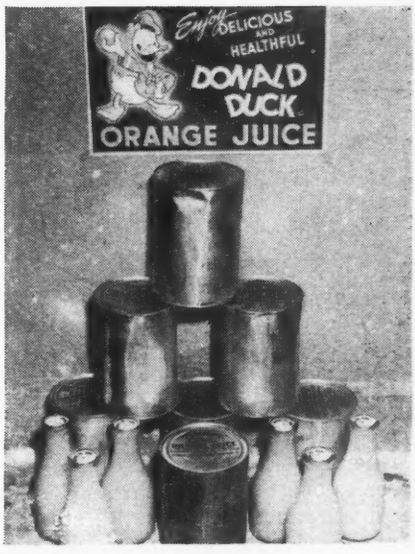
The wax or coating must not stick to the frozen meat nor separate upon unwrapping. Other physical properties should include non-toxicity, absence of objectionable odors which may be transmitted to frozen meats and absence of odor absorbing properties.

The surface of frozen meats, wrapped in some packaging materials has a dull and unattractive appearance. One extremely advantageous feature of a selected minority of packaging materials is the ability of the wrapping material to further enhance the appearance of the meat following freezing and storage. Some wrappers improve the physical appearance of the frozen meat products by producing a glossy surface. To take advantage of this, it is necessary to pack meat in a container, using the packaging material as an inner liner. The container must be inverted in the freezer so that the bottom is uppermost. A glossy surface will then appear on the top.

Orange Juice Delivered By the Milk Man

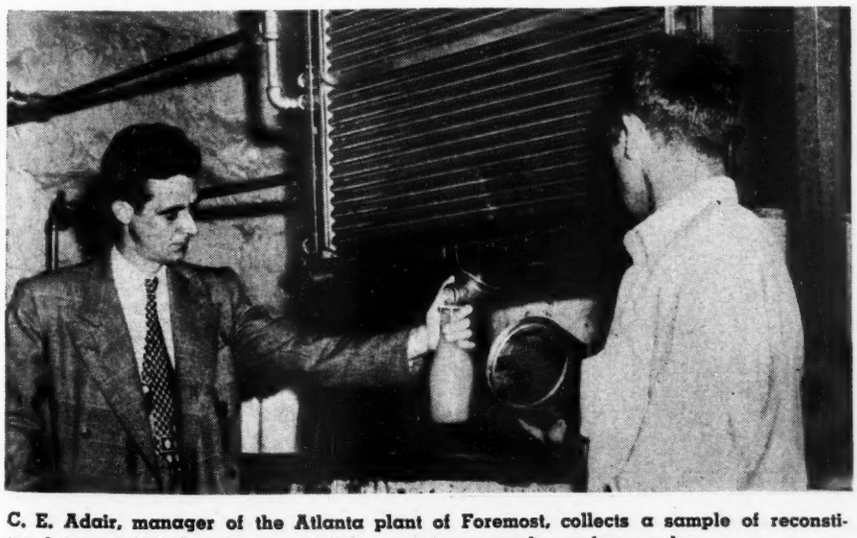
Reconstituted orange juice rivaling, in flavor and vitamin content, the juice of tree ripened oranges, is left with the morning's milk for residents of southern towns and cities served by Foremost Farms

By EARLE MAULDIN, Southern Editor, "Food Industries"



A step forward in the supplying of "fresh" citrus juices to the home was taken during the early part of this year in 12 typical towns and cities of the South. The locations were determined automatically when arrangements were made for Foremost Farms, Inc., to handle the distribution of "Donald Duck" orange juice. Well known in the dairy business throughout the South, Foremost delivers milk to several southern markets including Kingsport, Tenn., Charlotte, N. C., Spartanburg, S. C., Atlanta and Savannah, Ga., Jacksonville, Daytona and St. Petersburg, Fla., Shreveport, La., Ft. Worth and San Antonio, Tex., Montgomery, Ala.

The juice sold under the Donald Duck trade name has the flavor and over 90 percent of the vitamin content of freshly extracted orange juice. It is made up daily in each of the Foremost plants, from a concentrate that is produced by the Florida Citrus Canners Cooperative, at Lake Wales, Fla. At this plant, oranges are selected and blended to produce juice of uniform flavor. The juice is extracted, deaerated and deoiled, sterilized, concentrated under high vacuum at a low temperature, packaged and cooled in a continuous, high speed operation.* The amount of oil in the concentrate is carefully controlled. When all of the oil is removed the reconstituted juice has a flat unsatisfactory flavor. On the other hand, if none is removed, a strong, rancid flavor develops. Exhaustive tests and experiments have indicated that an oil content of 0.0025 to 0.0030 percent produces a flavor that is satisfactory.



C. E. Adair, manager of the Atlanta plant of Foremost, collects a sample of reconstituted juice which has been cooled by pumping over the surface cooler.

The concentrate in one gallon cans is stored under refrigeration and delivered to the various Foremost plants by express. When stored at a temperature of 45 deg. F., or lower, the concentrate can be kept indefinitely.

When preparing a day's supply of orange juice, the concentrate is removed from storage, allowed to come to room temperature and added to cold water in a refrigerated vat. Sufficient water is then added to produce a reconstitution of 7 to 1. Vigorous agitation is maintained throughout the entire mixing process. The reconstituted juice is then cooled and aerated by pumping over a surface cooler. It is filled into quart and half pint milk bottles which are capped and stored like bottles of milk.

Each day Donald Duck Orange Juice is delivered to homes together with the daily supply of milk on the regular deliveries. This eliminates the squeezing of oranges at home and the disposal of the rinds. It enables the housewife to keep a supply of orange juice in her refrigerator at all times.

Vitamin assays indicate that more than 99 percent of the vitamin C present in the orange on the tree is retained in the concentrate, and that over 90 percent of all original food elements are present in the reconstituted juice after standing 24 hours.

* For further information on the production of the concentrate see "Modern Technics Produce Quality Citrus Products", FOOD INDUSTRIES, vol. 17, 76-79, June, 1945.

Fifth Wheel Cuts Loading Time

Trailer-tractor connections are made from within driver's cab, permitting quicker hook-ups and greater platform capacity, with loading trailers lining up fender to fender

FIFTY-NINE fully-automatic trailers operated with twenty-one tractors have enabled the Fisher Bros. Co. to speed up the deliveries of groceries from its Cleveland warehouse to its retail stores. This speed up derives from two operational improvements, the quick hookups of the tractors and trailers and the preloading of some of the trailers so that the tractors do not have to wait while the trailers they haul are being loaded.

Since it takes an average of one hour, or more, to load a grocery trailer and only two or three minutes to hook the tractor to it, the advantage of trailer preloading is self evident. One of the 21 Fisher Bros.' tractors is a switching unit, so that the ratio of 59 trailers to 20 tractors, less any that may be out of service for repairs, gives approximately three trailers to each tractor.

With less than 59 warehouse loading positions, only as many trailers as there are positions may be loaded at a time. They are then pulled away from the platform edge by the switching tractor. As each loaded trailer is pulled out and parked, an empty trailer may be backed up into its space.

This arrangement has a two-fold advantage. First, it eliminates waste time for the warehouse loading crew, which occurs when the trailer loads for the stores are assembled and ready to load, but there are no empty trailers at the platform into which to load them. With an empty trailer always at the platform ready to be loaded, the loading crew can work continuously. Thus the excess of the trailers over the active tractors, in effect, greatly increases the size of the loading dock and with a given tonnage to load, a smaller crew can be employed, reducing labor cost.

The second advantage of the trailer preloading is in the saving in driver time. As soon as a driver returns from his first trip, a loaded trailer is waiting. All he has to do is to drop his empty trailer, hookup the loaded one and be off on his second trip.

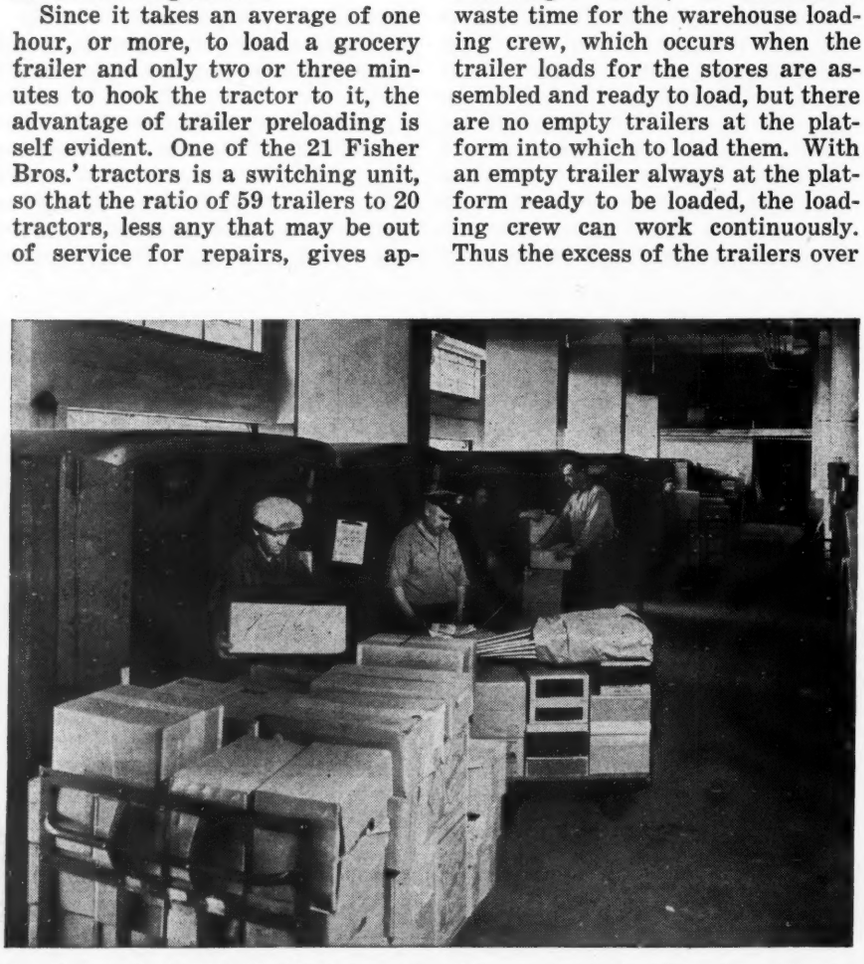
Sometimes a tractor driver can make two trips a day, without overtime, by routing one long and one short trip for the same tractor. On one-trip-a-day runs, the preloading of the trailer may enable the driver to complete the trip without overtime. Thus the elimination of wasted driver time and the reduction of overtime combine to reduce the driver-payroll and give a lower unit cost of delivery.

Still further savings in driver time have been gained by the use of fully-automatic trailers in place of the manually-operated type. The latter type, if fitted with air brakes on both tractor and trailer, requires driver to spot his trailer, dismount from his cab and disconnect the brake air hoses and lower the landing gear wheels. He then gets back into his cab and drives the tractor out from under the trailer nose. Connecting the two units is done in the reverse manner with the same number of operations.

With the Fisher Bros.' fully-automatic trailers, they are connected and disconnected without the drivers having to leave their cabs. This is accomplished in part by equipping the tractors and trailers with air-operated mechanical brakes, instead of straight air brakes. The driver is thus provided with the same ease of brake application, but brake hoses between the two units are eliminated as is the need for getting out of the cab to disconnect the hoses by hand.

The raising and lowering of the landing wheels by hand is eliminated by the use of the automatic fifth-wheel. The trailer brakes are operated through the fifth-wheel king-pin and are automatically set as soon as the uncoupling is completed. This provides a safety factor against fire, since in case of a fire originating on the tractor, it may be immediately disconnected from the loaded trailer.

The use of fully-automatic trailers also permits more trailers to be backed up against an open loading platform. They may be placed



Capacity of loading platform is increased in this case, since the fully automatic cab-disconnected trailers can be so closely placed. Space at the truck side is unnecessary.

This is one of the newer Autocar tractors operated by Fisher Bros., for the delivery of groceries, produce and meat to 221 master markets and retail stores in Cleveland and northeastern Ohio. The trailer is a 20 ft., fully automatic Trailmobile.

closer together as it is unnecessary to allow space between them for operating the landing gear.

While fully-automatic trailers cost more than the manual type, the additional expense has been more than offset by the advantages, The Fisher Bros. Co. started using the fully-automatic Lapeer trailer in 1914, and operated such units until 1934, when the fleet was replaced with Trailmobile cab-controlled units, as described and made by The Trailmobile Co., Cincinnati.

Latest Trailmobiles are Models L62, fitted with 18,000 lb. axles; 10.00 by 20 dual tires and 6-in. air-operated mechanical brakes.

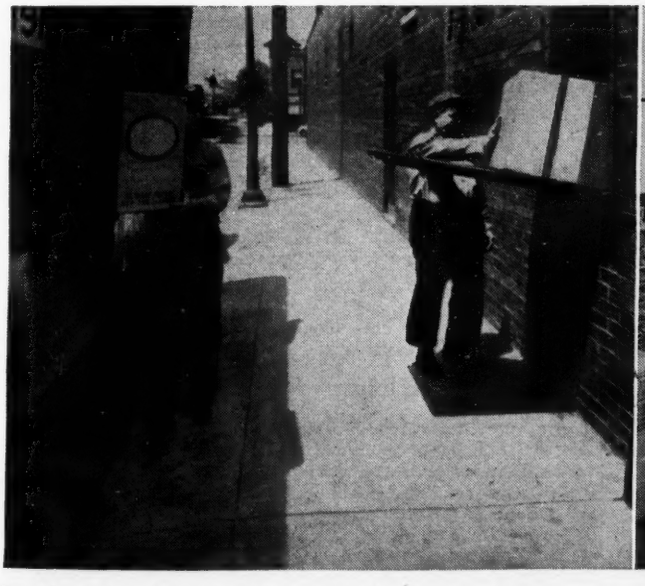
The trailer bodies are of the partially-insulated type and were built by Schaefer Body, Inc., Cleveland. The bodies are 20 ft. long and 8 ft. wide outside with an inside height at the side of 6 ft. 6 in. Side doors are provided on each side and double-doors over a tailgate at the rear.

The insulation of the bodies is of 4-in. Johns-Manville asbestos in the roof, 2 in. on the sides, front and doors. They have 1½-in. shiplapped wood floors with no insulation.

Not all the Fisher Bros.' bodies are insulated, since insulation is not required for the delivery of dry groceries. The insulated bodies are intended for produce that is usually delivered early in the morning. As no meats or frozen foods are carried, the lack of floor insulation is considered satisfactory.

All of the Fisher Bros.' tractors and trailers are painted in the same color scheme as used on all of the company stores, of which 221 master markets and retail outlets are operated in Cleveland and northeastern Ohio. The color scheme is green and white with gold lettering.

Frames are attached to both sides of the trailer bodies near the front end for the insertion of cards advertising special items sold at the stores. These cards are usually changed weekly.

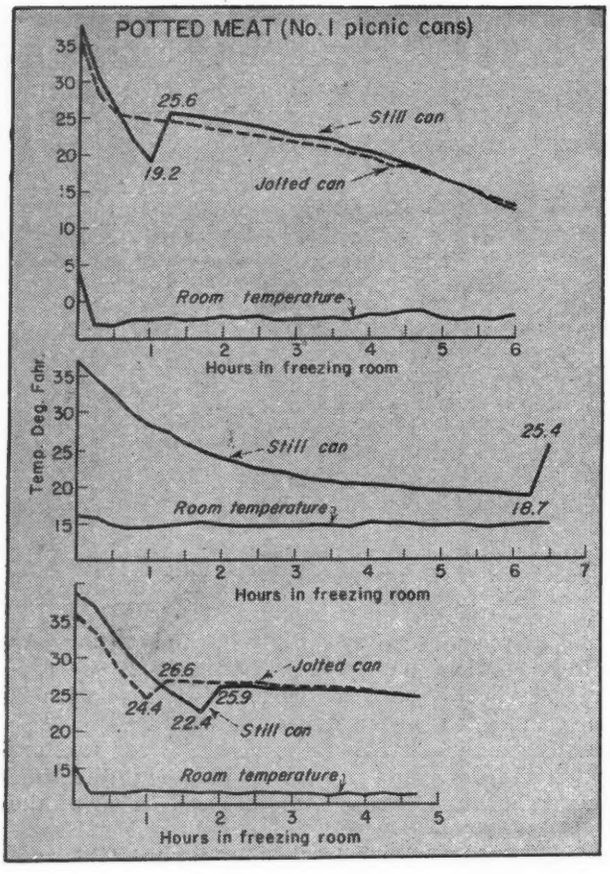


Outside and inside operations on the truck-to-store delivery are speeded by a conveyor at rear of store. This replaces the more time consuming use of hand trucks through conventional door.

Somehow the driver got into the picture at the right, but normally he remains on the outside, while one or two clerks take care of piling the delivered cartons in the retailers' rear storerooms.

Freezing Point Data Sheets And Cooling Curves

PART V

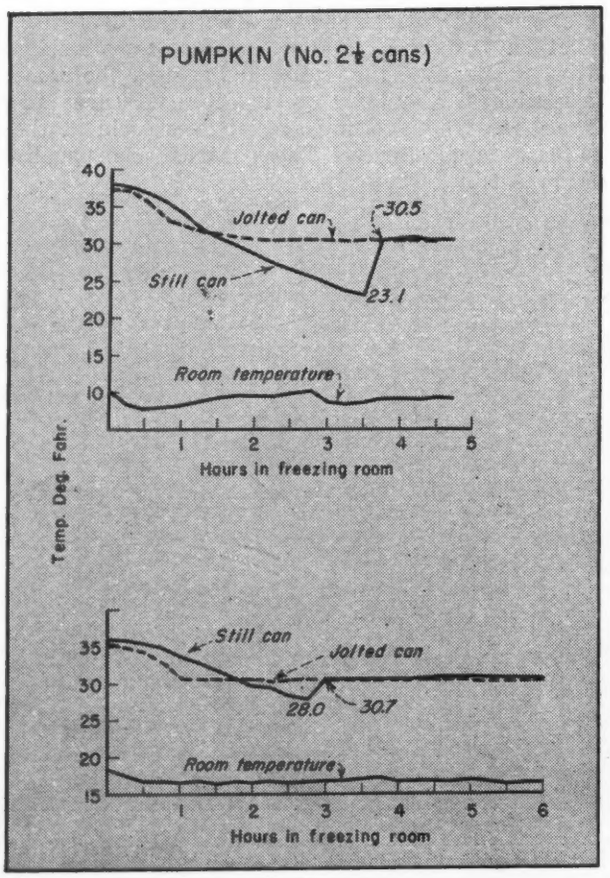


Potted Meat

Test Number	Freezing room temp. range		Commodity starting temp.	Time to reach freezing point (hr.)	Under cooling (hr.)	Under cooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 1 picnic cans:								
1-Still	11.1-	11.6	38.5	1¼	¾	3.5	2	25.9
1-Jolted ..	11.1-	11.6	35.9	1	¼	2.2	1¼	26.6
2-Still	14.6-	16.3	37.2	1½	5	6.7	6½	25.4
3-Still ....—	1.3-	— 3.2	37.7	½	¾	6.4	1¼	25.6
3-Jolted ..—	1.3-	— 3.2	36.4	¾	...	..	¾	25.6

Freezing point range, 25.4°F. to 26.6°F.; average, 25.8°F.

Inspection immediately after each test showed the contents frozen stiff throughout.



Pumpkin

Test Number	Freezing room temp. range		Commodity starting temp.	Time to reach freezing point (hr.)	Under cooling (hr.)	Under cooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 2½ size cans:								
1-Still	16.5-	17.3	36.0	1¾	1¼	2.7	3	30.9
1-Jolted ..	16.5-	17.3	35.5	1½	1	0.3	2½	30.8
2-Still	8.0-	10.1	38.1	1½	2¼	7.4	3¾	30.7
2-Jolted ..	8.0-	10.1	37.1	2	¾	0.2	2¾	30.5

Freezing point range, 30.5°F. to 30.9°F.; average, 30.7°F.

Inspection made immediately after each test showed the contents stiff with the formation of ice crystals.

Salmon

Test Number	Freezing room temp. range		Commodity starting temp.	Time to reach freezing point (hr.)	Under cooling (hr.)	Under cooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 1 tall cans:								
1-Still	15.1-	16.9	29.7	¾	1¼	0.3	2	27.2
1-Jolted ..	15.1-	16.9	32.8	1	1¼	4.8	2¼	27.3
2-Still	15.9-	17.3	34.9	1½	5¾	8.7	7¼	27.7
2-Jolted ..	15.9-	17.3	35.4	1¼	1¼	0.3	2½	28.3
3-Still	6.4-	7.7	37.9	2	2¼	8.3	4¼	27.9
3-Jolted ..	6.4-	7.7	37.6	2¼	1¼	0.3	3¼	28.0

Freezing point range, 27.2°F. to 28.3°F.; average, 27.7°F.

Inspection immediately after each test showed the oil in the top of the can solidified and a heavy slush beneath.

Acknowledgments

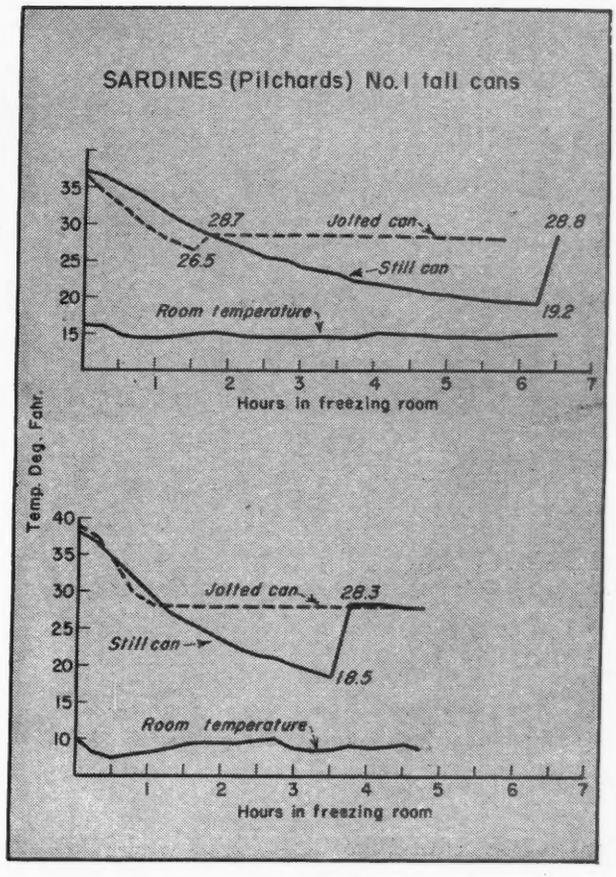
This research, an exhaustive investigation of the freezing of canned goods, was conducted by D. H. Rose, senior physiologist, Division of Fruit and Vegetable Crops and Diseases, U. S. Department of Agriculture, and H. D. Johnson, transportation specialist, Transportation, Rates and Services Division, Office of Distribution, War Food Administration. M. N. Weatherhead, assistant mechanical engineer of the Fruit Growers Express Company, assisted the government officials in the investigation, which was conducted by the experimental cold storage laboratory of the Plant Industry Station, U. S. Department of Agriculture, Beltsville, Md.

Sardines (Pilchards)

Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Under cooling (hr.)	Under cooling (deg.)	Total time to freeze (hr.)	Freezing point
No. 1 tall cans:							
1-Still	8.0- 10.1	38.1	1¼	2½	9.8	3¾	28.3
1-Jolted ..	8.0- 10.1	39.0	1½	1¼	0.1	2¾	28.1
2-Still	14.5- 16.1	37.2	1¾	4¾	9.6	6½	28.8
2-Jolted ..	14.5- 16.1	36.8	1	¾	2.2	1¾	28.8
3-Still	6.6- 12.7	36.4	1	3	8.0	4	27.5
3-Jolted ..	6.6- 12.7	37.3	1½	...	..	1½	27.5

Freezing point range, 27.5°F. to 28.8°F.; average, 28.2°F.

Inspection immediately after each test showed the oil in the top of the can had solidified with a heavy slush beneath. Hard frozen sample was slightly softer than the unfrozen one and contained a few broken pieces, although these were not objectionable.



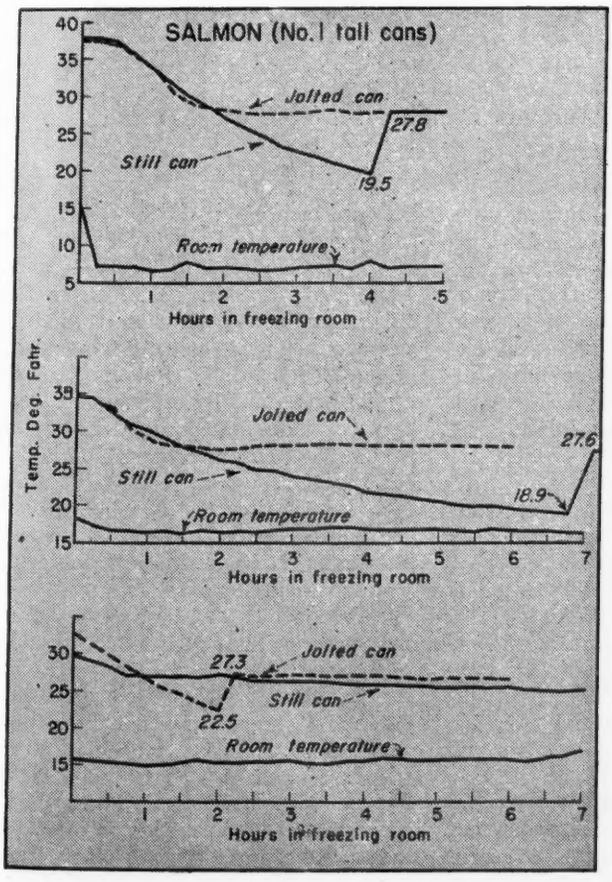
Spiced Meat

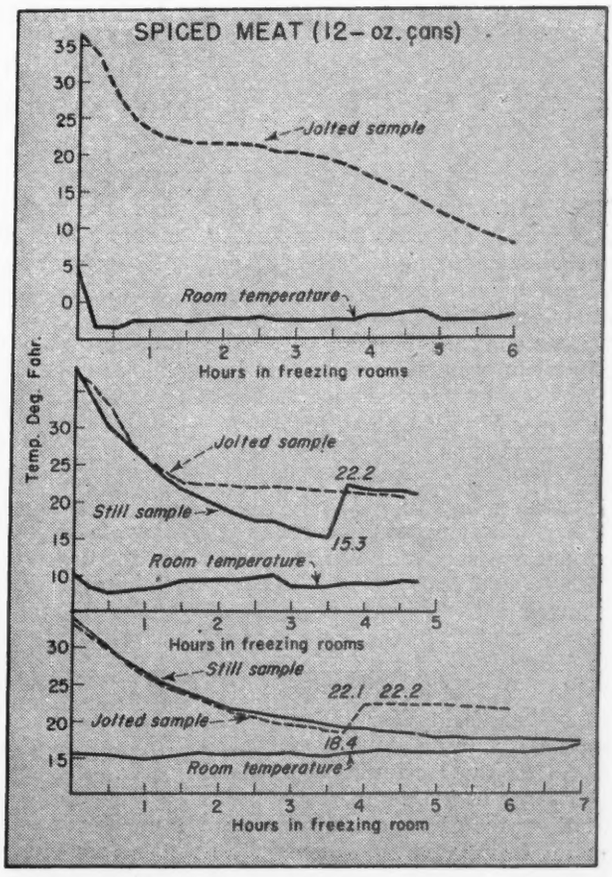
Test Number	Freezing room temp. range	Commodity starting temp.	Time to reach freezing point (hr.)	Under cooling (hr.)	Under cooling (deg.)	Total time to freeze (hr.)	Freezing point
12-oz. cans:							
1-Still	14.9- 16.9	33.9	2*	...	..	...	**
1-Jolted ..	14.9- 16.9	33.4	2	2	3.7	4	22.2
2-Still	14.7- 17.9	36.5	2¾	...	..	2¾	22.3
3-Still	7.7- 10.1	38.3	1½	2¼	6.9	3¾	22.2
3-Jolted ..	7.7- 10.1	37.5	1¾	¼	0.1	2	22.3
4-Jolted ..—	1.3- — 3.2	36.6	1¼	...	..	1¼	22.2

*Time for jolted sample to reach freezing point in same test.
**Sample did not freeze after being exposed to freezing room temperature for 7 hr., at which time its temperature was 17.2°F.

Freezing point range, 22.2°F. to 22.3°F.; average, 22.2°F.

Inspection made immediately after each test showed the contents frozen hard. Hard freezing showed no effect.





Canadian National Railways Photo

Salmon fishing boats being towed out to the fishing grounds in British Columbia's Pacific coastal waters. Good wartime salmon runs brought the fishermen $5,000 to $40,000 per season. About 90,000,000 lb. of canned salmon, a record 1945 pack, was put up.

Canada's Growing Fish Industry

The Dominion is largely dependent upon its export market, but a drive will be made for higher domestic consumption. Notable developments are the inland fisheries and the increased production of fish oil vitamins

By JAMES MONTAGNES, Toronto, Canada

DURING the war Canada became one of the great fish exporting nations, supplying Great Britain, West Indies, United States and other countries with a growing volume of fish. Since the end of the European war, fish exporting has not stopped. Canada's contribution in fish to UNRRA alone in the current year runs to 30,600,000 lb. of processed fish worth $9,600,000. Canada's fishing industry has grown from a prewar industry with production valued at $40,500,000 to $100,000,000 last year.

Incomplete reports for 1945 showed no halt in the upward trend in dollar return from Canadian seafishing operations which started early in World War II, according to the Dominion Bureau of Statistics, Ottawa. Continuing world food shortages and the imperative needs of liberated European peoples, are maintaining maximum demand for Canadian fish, and prices remain firm, the report states. Preliminary figures indicate a substantial increase in the catch of sea fish and shellfish, as compared with the prior year, and an increase of several million dollars in the value of the landings. Although no definite information has been received regarding the freshwater or inland fisheries, practically all of which are under the administration of provincial authorities, it is probable that there has been an increase in aggregate return.

Latest year for which complete dollar returns are available is 1944, which shows a market value of $89,426,868, as compared with $85,594,544 in 1943; $75,116,933 in 1942; $62,258,997 in 1941; and $45,118,887 in 1940, Canada's first full war year.

The total catch also increased during the war years. Thus in 1943, last year for which complete records are available, Canadian fishermen brought ashore 12,358,241 cwt. as compared with 12,062,088 cwt. in 1942; 11,988,652 cwt. in 1941, and 10,741,150 cwt. in 1938. Price to fishermen has been firmly maintained since price ceilings went into effect late in 1941. This is shown by figures Canadian fishermen received at point of landing. Receipts for the 1943 catch were $48,712,802; for the 1942 catch, $41,734,723 and for the 1941 catch, $36,046,019.

About 60 varieties of food fishes are caught in Canadian waters. Principal catches are salmon, herring, cod, lobster, whitefish, halibut, sardines, haddock, pilchard and pickerel. Principal fisheries are on the Pacific and Atlantic coasts. But catches of freshwater fish have increased in the past decade. Value of fish products marketed from British Columbia in 1944 totalled nearly $35,000,000. The three Atlantic coast provinces, Prince Edward Island, Nova Scotia and New

Brunswick, accounted for $38,000,000 in fish that year. Other provinces accounted for nearly $17,000,000, most of which was freshwater fish. Value of inland fisheries marketed in 1939 was $6,100,000.

Inland Fisheries

Increase in value and tonnage of freshwater fish is due not only to consistent fishing on the Great Lakes under international agreement with the United States, but also to development of fisheries in other freshwater lakes. In recent years commercial fisheries have grown in prairie provinces. Here large inland lakes, such as Lake Winnipeg and Lake Athabasca, as well as many smaller lakes, yield multi-million dollar catches for fishermen each year. Catches go not only to Canadian cities in the prairie provinces, but also to midwest cities in the United States. Fisheries on the prairies are maintained winter and summer. In winter fishing is done through the ice. Tractors pull heavily loaded sleds of frozen fish to the nearest railway. In some cases airplanes fly fresh fish direct to Canadian and midwest cities.

With improved transportation, commercial fishing on some of Canada's most northern lakes is feasible. Thus, a commercial fishery was started in 1945 on Great Slave Lake in the Northwest Territories. Over two million pounds of whitefish and trout, plus substantial quantities of other fish, were caught there. The fish was filleted and frozen with mechanical equipment on barges. Fish were then shipped 300 miles by barge and other boats to the railway and again shipped to urban markets in western Canada.

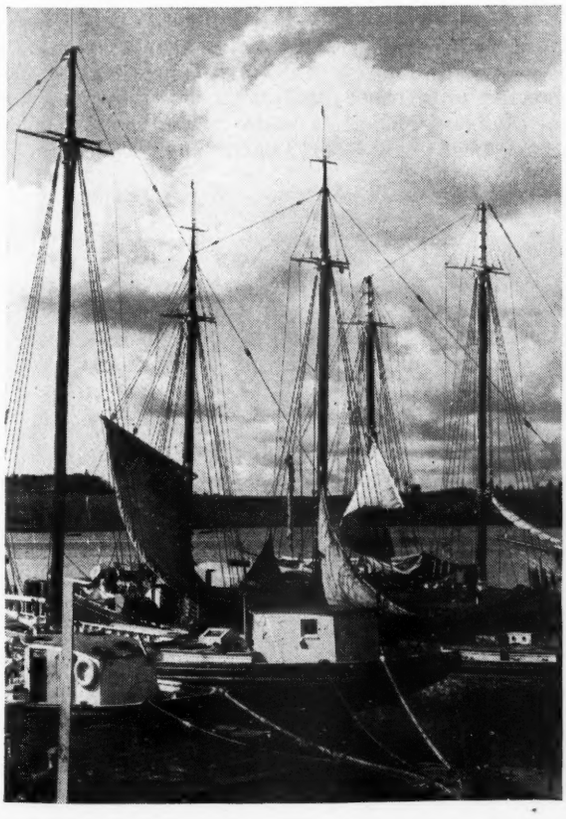
Canadian Fish Exports

Since 1940 about half of Canada's entire fish production was exported. Not a can of salmon was to be found on Canadian grocery shelves during most of the war. Even today only a small portion of the salmon pack is available for domestic consumption, most of it still going to Great Britain and UNRRA. Out of a record 1945 pack of 90,000,000 lb., only 14,400,000 lb. of canned salmon are available in Canada this year, while 67,200,000 lb. was exported to Great Britain. Great Britain is also receiving in the current year almost 41,000,000 lb. of canned herring from the Pacific coast catch. Almost 22,000,000 lb. of frozen fish, including cod, pollock and halibut, has been shipped to Great Britain this year. UNRRA received this year 14,200,000 lb. of canned fish, 12,000,000 lb. of pickled fish, 3,000,000 lb. of salted fish and 1,300,000 lb. of smoked herring. Some 35,000,000 lb. of salted fish, 38,000,000 lb. of pickled fish and 5,400,000 lb. of smoked fish are exported to the United States, British and Netherlands West Indies and some Central and South American countries.

"How long the present demand situation will continue cannot be foreseen," the Department of Fisheries states in a recent report, "nor can it be predicted with any certainty just what the conditions will be as to world trading and economics in the years after the period of transition from war to peace . . . So far as demand at present and in the immediate future is concerned, it is obvious that the supply position as against demand will soon be modified by the return to production of some countries that were completely or partially forced out of fisheries operations during the war years . . . World food needs are so great, however, that for the time being, the demand for Canadian fish remains at a high level."

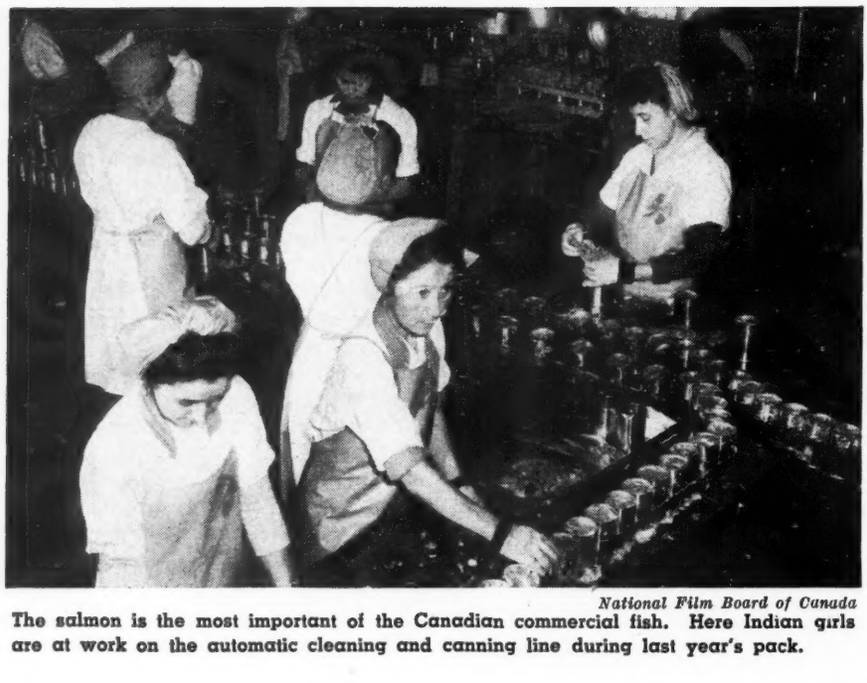
Wartime Difficulties

During the war fishermen and fish processors kept up production under difficulties. Output at approximately prewar level was maintained, in fact increased, despite a reduction in the number of cannery workers and fishermen due to enlistments in the armed services and employment in munitions plants and the requisitioning of vessels of



(Left): Fishing schooners at Lunenburg, Nova Scotia, on Canada's Atlantic coast, ready to head out to sea. (Below): Canadian fishermen unloading cod fish at an Atlantic coast port on Gaspe Peninsula, where fish is cured for overseas shipment. Efforts will be made to increase home consumption.

National Film Board of Canada



National Film Board of Canada

The salmon is the most important of the Canadian commercial fish. Here Indian girls are at work on the automatic cleaning and canning line during last year's pack.

the fishing fleet by the Royal Canadian Navy. Canned salmon, herring and sardines, frozen and salted fish, far exceeded the prewar production of the industry. Adjustments in processing catches were made to meet requirements of the armed services and the United Nations. Processing of fish for agricultural fish meals and the export of salt herring to Asia were stopped.

Fish Oil Vitamins

A wartime development with peacetime possibilities was the increased production of fish oils rich in vitamins. This development followed the collapse of Denmark, formerly Britain's main butter supplier. Canadian fish oil vitamins were used in vitamin-fortified margarine in Great Britain. Similarly, medicinal cod-liver oils were produced in Canada, replacing those of Norway. Demand for vitamin oils led to the utilization of fish waste, and catching of some fish which Canadian fishermen had not caught in prewar years. Included in utilized fish waste were the livers of ling cod, black cod, salmon, grayfish, soup-fin sharks, soles, halibut, swordfish and tuna. Their value to fishermen totals hundreds of thousands of dollars, and has resulted in establishment of a medicinal oil refining branch of the fish industry.

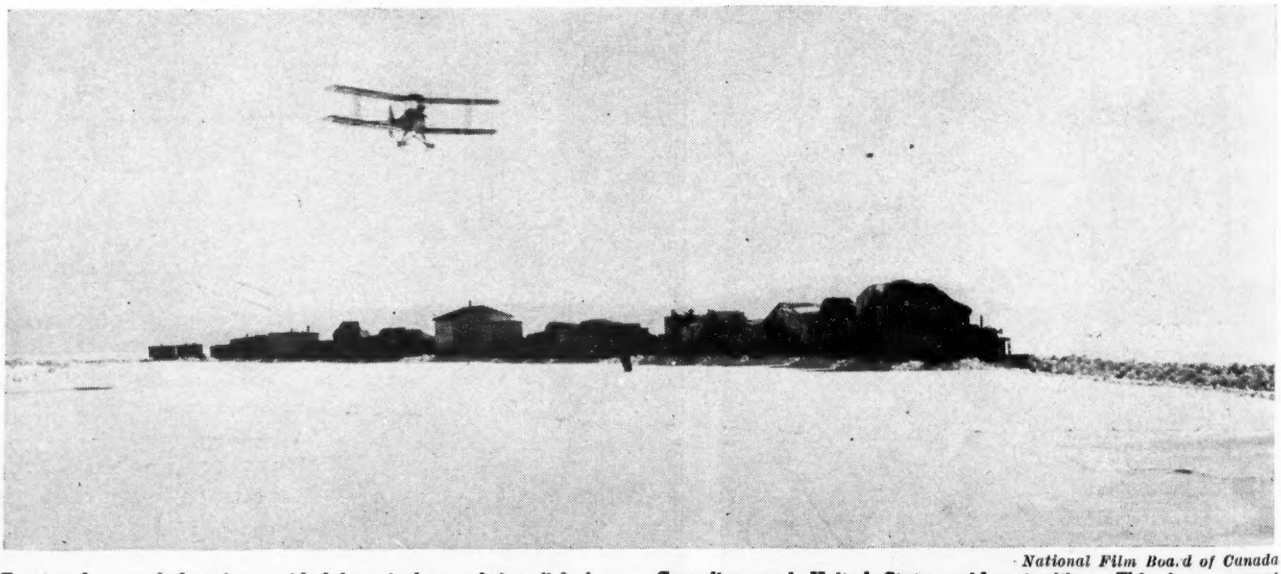
With increased world demand for his product, the position of the fisherman improved. There have been fewer fishermen to compete. Atlantic coast fishermen on the average have had an income increase during the war years from $350 to $1,000. Good wartime salmon runs on the Pacific coast brought fishermen $5,000 to $40,000.

The position of the processor is also more secure. Risks normal to export trade have in many instances been removed by government contracts and other arrangements which assure firm prices throughout the producing season. The processor also knows that the only brake on the upward trend in prices is the government price ceilings. New exporters, who were formerly restrained by lack of capital or by lack of experience in such markets, have come into the industry. Competition among exporters has been one of the principal influences in keeping up the prices to fishermen. This condition has made production bonuses or subsidies unnecessary.

Investment in Fishing Industry

The fish processing industry is associated almost entirely with the sea fisheries. Plants are scattered along the coasts in locations easily accessible to fishermen. There were officially 523 canneries and freezing plants in Canada in 1943, with a value of nearly $31,000,000. Of these, 69 were on the Pacific coast, and the rest on the Atlantic coast. Their production totalled almost $65,000,000 that year, and they employed nearly 16,000 men and women. That same year fishing vessels, boats, nets, traps and other equipment used by the sea fisheries were valued at $25,000,-

(*Turn to page* 228)



National Film Board of Canada

Tractor drawn sled trains, guided by airplanes, bring fish from the northern Canadian lakes to nearest railway for shipment to Canadian and United States midwest cities. This is a recent development, yielding multi-million dollar annual catches.

EDITORIALS

LAURENCE V. BURTON, Editor

Meat Decontrol

PRESIDENT TRUMAN faced a politically tough decision when he removed all price controls from meat and its products. It was the culmination of a long series of decisions most of which, in retrospect, had been better decided oppositely. Regarding decontrol of meat, he will be damned for what he did just as much as he would have been damned if he had retained control.

The first reaction to decontrol has been a spectacular livestock price rise. This is better than no meat at all. If people must do without meat, or without as much meat as they would like, the choice lies between lack of meat in stores or prices too high for the majority to afford. Let those who deplore decontrol realize that it takes two parties to make high prices where perishables are concerned: sellers **and buyers.** If the buyers refuse to pay the asked price, it will come down or the meat will soon spoil. In a free economy, food prices quickly adjust themselves to buying power. Under a controlled economy, somebody in control, being human and fallible, usually guesses wrong. Then we have the absurdity of meat scarcity in legitimate markets with plenty in black markets.

The president's decision to decontrol meats was proper, but it should have been done when the first OPA died.

Industrial Inventory No Cause for Alarm

THAT $18,000,000,000 item put out in August by the United States Department of Commerce as representing the value of manufacturers' inventories stood about $300,000,000 higher in September. This huge inventory figure appears to have been a factor in the recent stock market plunge. It is a big figure, but it needs interpretation before its significance justifies much influence on policy decisions by industrial management or the investing public.

Until the Department of Commerce supplies supplementary information it appears that the magnitude of the national industrial inventory is not due to buyers' resistance so much as to materials in the course of manufacture that cannot be completed by reason of shortages and strikes. For example, a warehouse full of domestic refrigerators minus their door hinges is inventory but, though worth many millions, the refrigerators cannot be sold until the missing hinges are put on. And it should not cause alarm to the wary who are seeking "Indian signs" that may portend disaster. Just try to buy a refrigerator if you are in doubt.

Under other circumstances the $18,000,000,000 inventory might have a definite forecasting importance. But today it is transcended by the strike factor, the refusal of people to work at good wages, the 52-20 adjustment to ex-G.I.s, and Congressional ineptitude in futile attempts to institute a partially managed national economy.

It is to be hoped that this is the last of the reports put out by the Department of Commerce without further explanation. The new Secretary, A. W. Harriman, can do much to revive the esteem in which the department was once held when it was truly a representative of business. When Henry A. Wallace released the statement that industry could pay higher wages without raising prices he must have been thinking in terms of corn—hybrid corn.

That $18,000,000,000 inventory figure will revert to normal proportions just as soon as the American people quit striking and really begin to produce. With continued strikes it may even go somewhat higher, but it will have small significance unless the buying power of the public becomes substantially reduced by forces that are not apparent at the moment.

The A & P Decision

THE finding by the Federal District Court at Danville, Ill. that A & P is a monopoly will be subject to review by the higher courts, for A & P has filed an appeal that probably will go to the highest court. Should the Supreme Court consent to review the case and sustain the lower courts, the decision will be one of the most momentous affecting the sale of all sorts of food.

Despite the fact that much of the Danville case centered around the activities of the Atlantic Commission Co., which deals chiefly with unprocessed foods, the decision, if sustained, will settle once and for all the legality of operating a chain store at a loss if the purpose of such activity is to eliminate competition, or if such profitless operation is not patently necessary to meet competition whether the intent to wipe out the competition is there or not.

The intent phase of the foregoing need not concern us here, for nothing is more difficult to prove in court than what somebody's intent may have been.

If the decision is sustained it will probably mean a new lease on life for the independent retailer, a less hazardous competitive existence for the wholesaler and a correspondingly improved opportunity to smaller food companies to sell processed foods at a reasonable profit—until some-

body figures out a new way to undersell.

John Hartford, president of A & P said in court that it will cost the people more for their food. If this proves to be true, it will have to be accepted as the price to be paid for freer competition in grocery merchandising.

"Price Control" Unemployment

EIGHT departments at Lever Bros. plant and office at Cambridge, Mass., have been closed and the personnel disbanded as a result of the fat and oil shortage. Packinghouse employees are not the only ones who have taken it on the chin because raw materials are scarce. Next in line for curtailed operations appear to be about one-fourth of the small retail bakeries, which, according to the Secretary of Associated Retail Bakers of America, will be due to scarcity of shortening.

Between the unemployment caused by strikes and the unemployment caused by price control there is little choice. The strikers, however, can decide when they want to return to work.

Food Technologists Who Have Made Good

JAMES McGOWAN, Jr. is president of Campbell Soup Co., succeeding Arthur D. Dorrance who died September 22. The occasion for comment here is that Mr. McGowan is the third successive technical man to head the company.

Sales-minded executives are wont to discount technical men for top jobs and aver that 90 percent of all executive problems are selling problems about which a technical man is supposed to know less than nothing. Yet Campbell Soup Co., one of the outstanding companies of the United States—whether food or otherwise—grew to its present stature under the direction of technical men. Rigid quality control and low cost production are the basis of its success.

In its early days the firm, known as the Joseph T. Campbell Preserving Co., enjoyed only a modest success until "Uncle Joe" Campbell persuaded a nephew, John T. Dorrance who had just received a Ph.D. degree in chemistry in Germany, to join the business to aid his uncle. In time the chemist's ideas prevailed and he finally became president. After his death in 1930, his brother Arthur C. Dorrance, trained as a chemical engineer at Massachusetts Institute of Technology, became the third president. Dr. Dorrance had arranged that his younger brother had worked in many places before he was added to the staff of Campbell Soup Co. We recall that part of his "post-graduate" training required that he work in a hotel kitchen learning how to cook. At one time he worked for Gorton-Pew Fisheries with Michel P. Vuccasovich, the first man in the United States to hold the official title of Food Technologist.

James McGowan, the fourth president, is a graduate of Massachusetts Institute of Technology in chemistry and has served in a variety of capacities at Campbell Soup Co. In recent years, he supervised the construction and equipping of the Chicago plant, later managing it. Next he was production manager of the company's operations, and since 1939 he has been vice president in charge of research and development, serving as acting general manager on several occasions.

Maybe Campbell Soup employs a special breed of technical men, but never let it be said that technical men cannot create and operate a successful company. Food technologists can profit by the experiences of these three, and master not only technical problems but sales and executive technics as well. The time will come when most of the top jobs in food processing companies will be occupied by food technologists.

New York's Sanitation Drive

THE SANITATION drive in New York City, by the Health Department, has now gone into its fourth month and is extending into food processing establishments. It started with public eating places with the result that an astonishing number are now "Closed for Alterations."

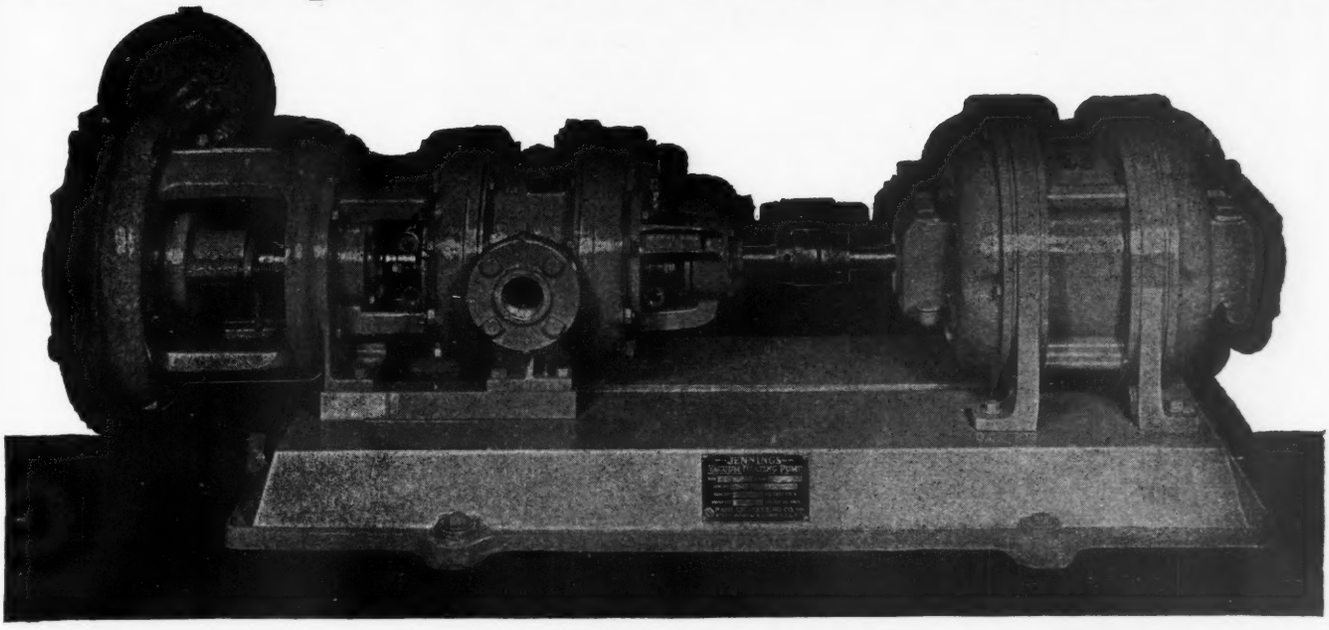
Next came the drive on bakeries, especially the small basement type plant that was built long ago when brick peel ovens were too heavy to support on wooden structures. With the advent of steel construction the basement bakery was merely a hold-over from an earlier day without notable improvement in sanitary facilities, equipment or practices.

Currently the drive is directed toward some 250 candy factories, the owners of which were convened by the Health Commissioner to receive instruction as to the conditions to be met. The commissioner pointed out that obsolete equipment, though difficult to replace with better designs, could and must be kept clean. He went a step further and assured the owners that the department would use its powers to bar the "unregenerate, dirty worker" from the industry.

This policy would undoubtedly absolve the employer from difficult relations with unions, which conceivably might regard efforts to enforce good sanitation as an unfair labor practice. It is something that many employers will welcome.

Where the drive will next focus its attention is immaterial. Cleanliness and good sanitation are indispensible for a successful American food industry. Not only is it a moral and legal right for all consumers to procure their food from clean plants, but the manufacturer also benefits through attracting higher grade employees. By this means he may recover by increased efficiency, much of the cost of keeping his premises up to required standards. These principles hold wherever a food processing plant is located.

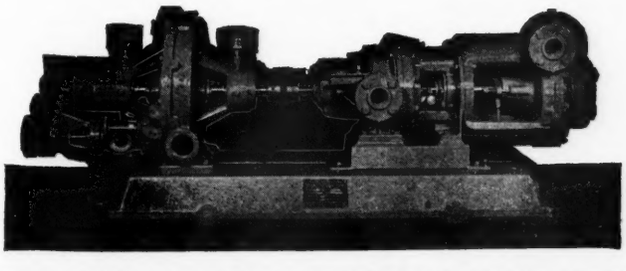
Nash—the Perfected Vacuum Pump for Evaporators and Condensers



COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.

NASH ENGINEERING COMPANY

SOUTH NORWALK • CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Test Marketing

PRECOOKED frozen foods have invaded the market with such speed and volume that it is difficult at times to discern the new from the old and the good from the poor.

Quality has suffered in many instances, because of the haste that some manufacturers have used in developing and testing a product.

This cannot be said of Maxson Food Systems, Inc., with general offices in New York. The company is slowly working toward an ultimate goal of some fifty precooked frozen food items.

After months of research and development, a single product is placed in a temporary package and sold in one or two stores in a testing area. When a customer buys it, her name and telephone number are written down by the clerk and Maxson invariably calls her for a constructive criticism. In this way, the success of a new food is a fairly sure thing by the time it hits the general market.

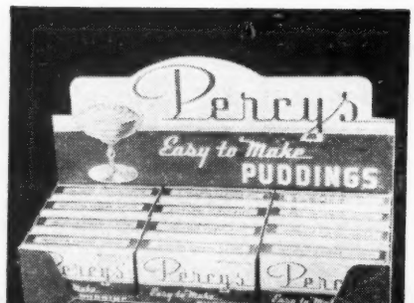
Maxson is now testing three precooked frozen foods in the New York area. The character of each of the three is notably original. Packaging, likewise, is unique.

Carrots a la Vichy, containing carrots, turkey broth, onions, butter, flour, shortening and seasoning, is packed in 3-oz. glassine bags —4 to a wax-coated carton. After heating for 30 min. at 400°, this food is ready to be served.

Turkey Hash is divided into 6-oz. cellophane-wrapped portions, two to a carton. Ingredients include turkey, potatoes, green peppers, butter, onions and seasoning.

Corn a la Mexican is an appetizing dish containing corn, water, onions, pimientos, green peppers, shortening and seasonings. It is packaged in the same manner as the carrots.

Net weight of each carton is 12 oz.



Color Is The Thing

GAYLORD CONTAINER CORP., St. Louis, used its Quanta color system of color harmony in redesigning the packages for Percy's Desserts, manufactured by Daniels Tested Products, Inc., Kansas City, Mo.

Realizing that the old designs offered opportunity for improvement, Daniels asked Gaylord's packaging engineers to modernize the display cartons and individual containers for its pie fillings and puddings. Objectives were to improve shelf visibility, provide quicker identification, assure greater appetite appeal and use more pleasing colors.

Flavors now are shown clearly on the top of each individual carton and the number of different flavors indicated on the front of the display carton.

Appropriate colors from the first Quanta were selected to provide brightness, contrast and an appealing freshness. The pudding packages are a buff and deep blue, while the pie filling closures are buff and maroon.

Smoky Spread

KRAFT FOODS CO., like many other food concerns, is anticipating a parade of new postwar products. First in the line-up is a cheese spread, appropriately called Smo-Kay.

It is a combination of American cheddar cheese and hickory smoke flavors. Packed in a five-ounce reusable glass, Smo-Kay is one of Kraft's "Swankyswig" line of spreads.

Bring On The Steak

HERE is an arrangement that should be highly welcome to many a housewife.

Tru-Taste Food Co., Long Island City, has taken on the job of peeling and slicing onions, deep-frying and then freezing them.

Spanish onions are used and the finished product is packed 5 oz. to a carton. This is equivalent to 1¼ to 1½ lb. of raw onions.

They are ready to be served after being heated in a moderate oven.

Wisconsin Cheese

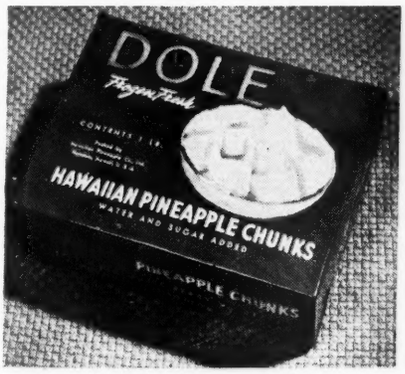
"BREAD and cheese is gude to eat when folk can get nae ither meat."

So goes the slogan of Sak's Cheese House, Middleton, Wis., packer of Sak's natural cheeses.

Most recent offering of the company is an assortment of eight types of Wisconsin cheese, attractively packaged for hostess gifts.

Included are Mel-O-Pure, domestic blue, Roanne natural, Swiss, smoky roll, American, brick cream and Saluette cheese. The smoky roll is a blend of gouda, Edam and cheddar, whey concentrate, sodium citrate, sodium phosphate and salt.

The paper-covered box is yellow with black printing. Design includes interesting sketches of various cheeses.



Quick Frozen in Hawaii

COMMERCIAL freezing of Hawaiian pineapple has been inaugurated by the Hawaiian Pineapple Co., Ltd. San Francisco.

The company's Dole label on canned pineapple and pineapple juice is familiar to most. Now the same label appears on a 1 lb. package of frozen fresh Hawaiian Pineapple Chunks.

One pilot line of specially adapted machinery and equipment presently is being operated in a section of the fruit cannery. Under full capacity, it is estimated that 960 1-lb. packages will leave the end of the line every 20 minutes.

A light sirup is added to the chunks which are packed in laminated cellophane bags—air- and water-tight. A standard flat frozen food carton is used with printed transparent overwrap. The colors, red, blue and gold, correspond with the Dole cans.

At present, the frozen item is being test marketed in Newark, N. J., and Reno, Nev.

It is expected that the supply of the product will be limited for some time.

Aluminum Container

A RECENT development by the Bjorksten Laboratories, Chicago, and A. B. C. Packaging Machine Corp., Quincy, Ill., is an aluminum container, known as "walpouch."

It consists of corrugated aluminum foil with double crimped joints and will hold 3 oz. of powdered material, 4 oz. of liquid or 6 oz. of semi-liquid food.

Costing approximately $.008 a package, it can be fabricated in the packer's plant from two rolls of .0025 gage aluminum foil, fed into a special machine which can be adjusted to accommodate sheets of sizes varying from 2 to 8 in. in width or length.

The package is hermetically sealed and moisture-vapor-proof.

Chow Mein Dinner

A CAN of vegetable chop suey, a jar of chow mein noodles, some soy-tang sauce and a tea bag are packed together by Ben-Gee Products Inc., Chicago, to provide a convenient and easy-to-prepare meal.

The company packages the Chinese foods in brightly colored containers—red and yellow predominating.

The 1 lb. 2 oz. can of chop suey contains bean sprouts, celery, mushrooms, pimientos and seasoning. This combination is cooked in its own vegetable juice that has been made into a gravy with soy-tang added.

Four and one half oz. of noodles complete the oriental dish.

Shortening Clean-Up Time

Big ones or little ones, your clean-up crews finish in record time with Metso Granular*. The twin action of Metso lifts the toughest film of greasy or oily dirt and then floats it all away, preventing the removed dirt from redepositing. Less effective cleaners leave behind a greasy film which you can feel. Metso leaves surfaces dry and greaseless.

Metso is easy to use and conveniently available in 100-lb. bags and 300-lb. barrels. Specify Metso on your next order. Distributors are located in over 65 cities.

Philadelphia Quartz Company
Dept. D, 125 S. Third St.
Philadelphia 6, Pa.

metso
Cleaners

*Sodium Metasilicate U. S. Pat. 1898707

Does Your Air Need a BOOST?

- SPACE-SAVING
- COST-SAVING
- SIMPLE INSTALLATION
- DEPENDABLE, EFFICIENT DELIVERY

For all performance ratings and other details, write for Bulletin 3533.

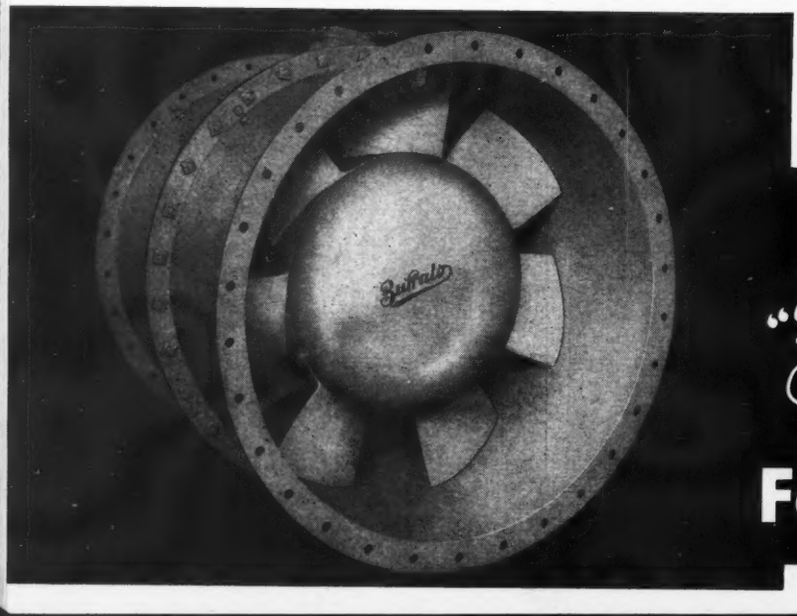
INSTALL DUCT-MOUNTED "Buffalo" AXIAL FLOW FAN

Do you have a blowing or exhausting system in your plant requiring *higher delivery* than it can give? Or are you planning a system calling for booster stages where space is small?

If so, "Buffalo" Type B Axial Flow Fans will fill your need perfectly!

Available in a wide range of sizes, in Tube-Axial or Vane-Axial design, direct connected or belted, "Buffalo" Axial Flow fans give you these performance advantages: *straight-line air flow and directional inlet vanes to cut turbulence and energy losses . . . the non-overloading characteristic which prevents motor burnout . . . and high efficiency that means operating economy.* Hundreds of these installations are giving trouble-free service.

The "Buffalo" representative in your nearest principal city will gladly advise you as to your booster problem . . . or any other air problem.



BUFFALO FORGE COMPANY
152 Mortimer Street Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" AXIAL FLOW FANS
For Duct-Mounting

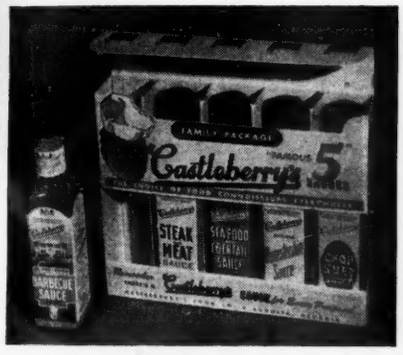
Family Package

HOUSEWIVES should find it convenient to purchase Castleberry's "Famous 5" Sauces because Castleberry's Food Co., Augusta, Ga., has packed all five in a handy partitioned carton.

The bottles are easily accessible and are protected by double cardboard partitions. A front panel is cut out of the carton so that the bottle labels are in sight—and they are eye-appealing.

Colors abound in this package, but mostly there are yellow and red. Eight old southern recipes are printed on the back of the carton. (These do not necessarily require the use of the sauces.)

Southern Barbecue Sauce is recommended for Chicken. Worcestershire Sauce brings out meat flavors. Steak and Meat, Sea Food and Cocktail and Chop Suey Sauces have obvious uses.



Frozen Pot Pie

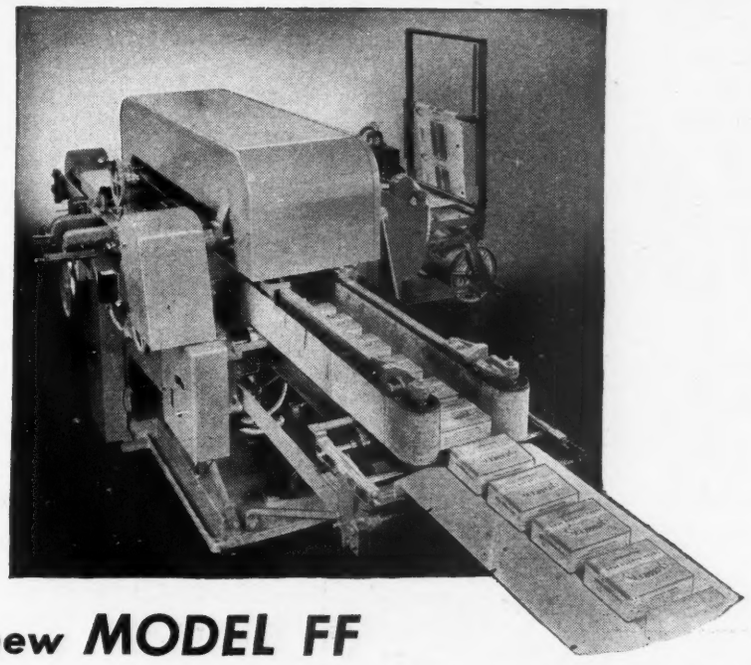
QUICK Frozen Chicken Pie en Casserole. That is the latest item presented to the consumer by Frozen Wonder Food Corp., New York.

The company combines large chunks of fresh chicken, potatoes, carrots, peas, onions, lima beans and mushrooms, pre-cooks it with a thick gravy, covers with pie crust.

The pies are individually packed in a re-usable glass casserole with lid.

Directions are to place uncovered dish in a pre-heated oven and bake for twenty minutes.

It's NEW...It's BETTER



The new MODEL FF

Designed especially for wrapping FROZEN FOODS

An outgrowth of our widely used FA model, the new FF offers you the most modern advancements in wrapping machinery. Moreover, every feature of its construction has been designed with the special requirements of the frozen food packer in mind. We know from wide experience what those requirements are.

For example, its *new type elevator-well* overcomes variations of up to 3/8" in the size of packages being wrapped. No more trouble with pre-frozen foods.

And when it comes to *wrapping various brands,* you'll find its advanced electric-eye scanning head a real advantage, for it registers from any point across the entire web of the paper roll.

Can be *shipped from one location to another with ease,* because discharge and infeed are both supported from the base of the machine, making it virtually one complete unit. Incidentally, its discharge belt has been reduced to a mere three feet in length by virtue of an advanced type of overhead transport which allows discharge belts to run slower, thereby affording the same amount of cooling time as with a 7-foot discharge.

40 to 100 packages per minute

At this cost-cutting speed, the FF turns out uniformly perfect wraps—firmly sealed and with printed matter accurately located for attractive, sales-winning appearance.

Orders for the FF are coming in at a rapid rate—so if you will need faster, better equipment, we suggest that you write us now for complete information.

PACKAGE MACHINERY COMPANY, Springfield 7, Mass.

30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Ave., Cleveland 15 • 849 Marietta St., N. W., Atlanta 3
443 S. San Pedro St., Los Angeles 13 • 320 Market St., San Francisco 11
18 Dickens Ave., Toronto 8

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

STOP KETTLE DANCING*

When cans are unduly agitated in the retort, the packer is experiencing a case of "kettle dancing"—a vicious "vice" which mars cans and their exterior coatings—deforms seams and breaks down the product.

Crown Field Service men know how to stop kettle dancing. It's simply a question of the proper hookup of the retorts. In fact, Crown men are helping to conduct an "anti-kettle dancing" crusade—another example, by the way, of Crown personalized service.

*Kettle dancing is the agitation of cans in the retort due to improper movement of water and steam through the system during the process.

CROWN CAN

THE NATION'S THIRD LARGE SOURCE OF SUPPLY

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FOOD INDUSTRY NEWS

GENERAL

Glass Jar Standardization Revoked Over Industry's Head

Order L-103, ruling out fancy glass containers, had provided increased production without additional facilities

REVOCATION of the glass container standardization order, L-103, October 30, came as a complete surprise to the industry, over whose opposition the action was taken. While the Industry Advisory Committee was in the mood to recommend the removal of the controls established by the order when they met in Washington, early in October, a second look caused them to decide to hang on to L-103 as long as possible. The prospect of a flood of orders for short runs of bottles and jars made in private molds of special design was not pleasing to the glass container people who have had a taste of the savings to be made through long run lightweight standard items.

L-103 was a war baby that grew up into a thing of beauty. Industry men were astonished at the success of the plan they worked out at the request of WPB. The order replaced the myriad of private designs with a few hundred compact light-weight standard packages that saved material and made use of the latest in glass technology. The length of the average run tripled. Grossage went up 80 per cent with no increase in facilities. Packaging capacity produced by the industry increased 150 per cent. There was less idle time for mold changes, higher operating speeds, longer runs, lower costs, and greater profits. This was the direct result of the industry-wide use of the relatively few designs and sizes permitted by the schedules of L-103.

When it came to the showdown, the glass industry apparently decided that it would let well enough alone and keep the umbrella over *itself* as long as possible. A return to the prewar pattern of the industry, with packers of foods, drugs, cosmetics, household specialties and hard and soft beverages; asking for special designs, meant a sharp loss of production, which has been variously estimated at as high as 25 per cent in gross ware and 40 per cent in gallonage. This prospect coupled with the chronic tin shortage and the effect of last year's steel strike also has accounted for an unwillingness on the part of CPA to let go control of glass designs. Apparently the industry was of the same mind, even though next March will see the end of CPA.

A stampede to fancy custom-made packages is not expected by glassmen even though there has been much pressure from the cosmetic industry for an end to the restrictions on private molds. To a large extent high-style packaging is the life of the toilet goods industry. The glass industry could meet this demand without serious difficulty. A call for custom packages by the food and liquor industries would be another matter. The beverage people have always gone for fancy bottles in a big way.

Three factors counted on to check a stampede are the cost of special molds, the difficulty of getting them produced by the overtaxed mold shops, and the fact that container manufacturers today are selling machine time as much as glassware. Buyers who insist on special molds may therefore expect difficulty in getting what they want when they want it.

Processors using glass packages had an added interest in continuing the use of standard shapes. Beside the lower cost, the plain round wartime shapes save warehouse space, shipping weight, carton costs and job changing time on production lines.

Says Abuses Not Size Issue in A & P Case

MANY segments of the food industry, other than retailers are tending to cross fingers pending the appeal to the Supreme Courts from the recent Danville, Ill., decision finding the A & P guilty of monopolistic practices. Chief concern of the industry has been whether mere bigness is being singled out by the Department of Justice for anti-trust action.

Members of the department have denied that bigness has anything to do with their prosecutions, declaring that it is only the unfair advantages which the size and integrated functions of the large corporations permit, that is being attacked.

Speaking of the A & P decision recently, Holmes Baldridge, Assistant U. S. Attorney General, to the Wholesale Grocers Association, de-

(Press Association)

JUST BEFORE THE RUSH

This picture was taken two days before President Truman's "decontrol" speech on a Nebraska feed lot just southwest of the Omaha city limits. You will have to imagine the scramble for the cattle cars a few days later. Prospects for filling the meat channels in the near future were far from bright in the opinion of most meat packers.

cleared that no attack was implied on the size, or vertical or horizontal integration, or mass production buying or selling, nor was it an attack on the chain store system.

He said that the department's investigation of food industry practices, launched five years ago, has stressed only the abuses imposed on competitors by the illegal use of power.

Specific practices that stand condemned by the A & P decision, Mr. Holmes said, are:

1. The use of mass purchasing power to secure discriminatory buying preferences on purchases. 2. The taking of price preferences from suppliers which have no relation to actual costs. 3. Requiring suppliers to pay advertising costs of the purchaser who resells. 4. Abuse by an agent of a fiduciary relationship by serving two principles whose economic interests conflict. 5. Subsidization by an integrated concern of its retail operations profits derived from operations of the business other than retail, where such profits have been secured through the imposition of trade restraints.

Expansion Plans Force Heinz To Offer Stock

THE 77-year-old H. J. Heinz Co. Pittsburgh, has made application to the Securities and Exchange Commission for registration of some of the stock of the company for public sale, H. J. Heinz, II, president, recently announced. This is the first time in the company's history that a public offering of its stock has been planned.

"Until the present time," Mr. Heinz said, "it has been possible through a conservative fiscal policy to provide for expansion from earnings. During recent years, however, the government tax structure has made it increasingly difficult to retain a sufficiently large part of earnings to finance entirely our expansion of factory facilities, warehouse space and inventories."

The management and control of the company will remain in the same hands, with Mr. Heinz as president and chief executive officer.

GMA Forms Farm Panel As Food Processor Aid

PAUL S. WILLIS, president of Grocery Manufacturers of America, Inc,. has announced the formation of the Farm Panel of America, an organization of 800 young farmers, which will work with food processors toward the development of improved marketing methods for farm products.

Nominated for Panel membership by state Vocational Agriculture Education leaders, the 800 farm representatives will aid in the establishment of a continuous two-way flow of vital information between the farm and the food manufacturing plant.

Purpose of the Farm Panel of America, according to GMA's Agricultural Consultant Dave Thompson, is threefold: to help grocery manufacturers to better realize the problems which confront the farmer; to aid the farmer in understanding manufacturing problems, and—through mutual interest and understanding — to enable both groups to more speedily solve common problems.

Rehydrate Dry Milk In Mexican Capital

POWDERED milk, imported from the Kraft Co., and rehydrated in a recently completed $1,000,000 plant, Lecheria Nacional, S. A., in Mexico City, is looked upon as a first step in relieving the serious milk shortage in the Mexican capital. Initial production is said to be around 80,000 liters, although the plant has a capacity of 500,000 liters. The milk will be distributed door to door in square, sealed cardboard cartons such as many dairies in the U. S. now use.

Equipped with U. S. machinery and employing U. S. production and distribution methods, the new plant will introduce many sanitary practices heretofore untried in the Mexican milk industry.

Weights and Measures Back on Active List

STATE weights and measures people, inactive during the war, are now operating at the old stand with even greater vigor than they previously displayed. Recent recommendations of the National Conference cover a wider variety of items that come under the jurisdiction of federal authorities to whom the state officials are showing the way in the matter of promoting tighter regulations of the packaging and markings of consumer goods.

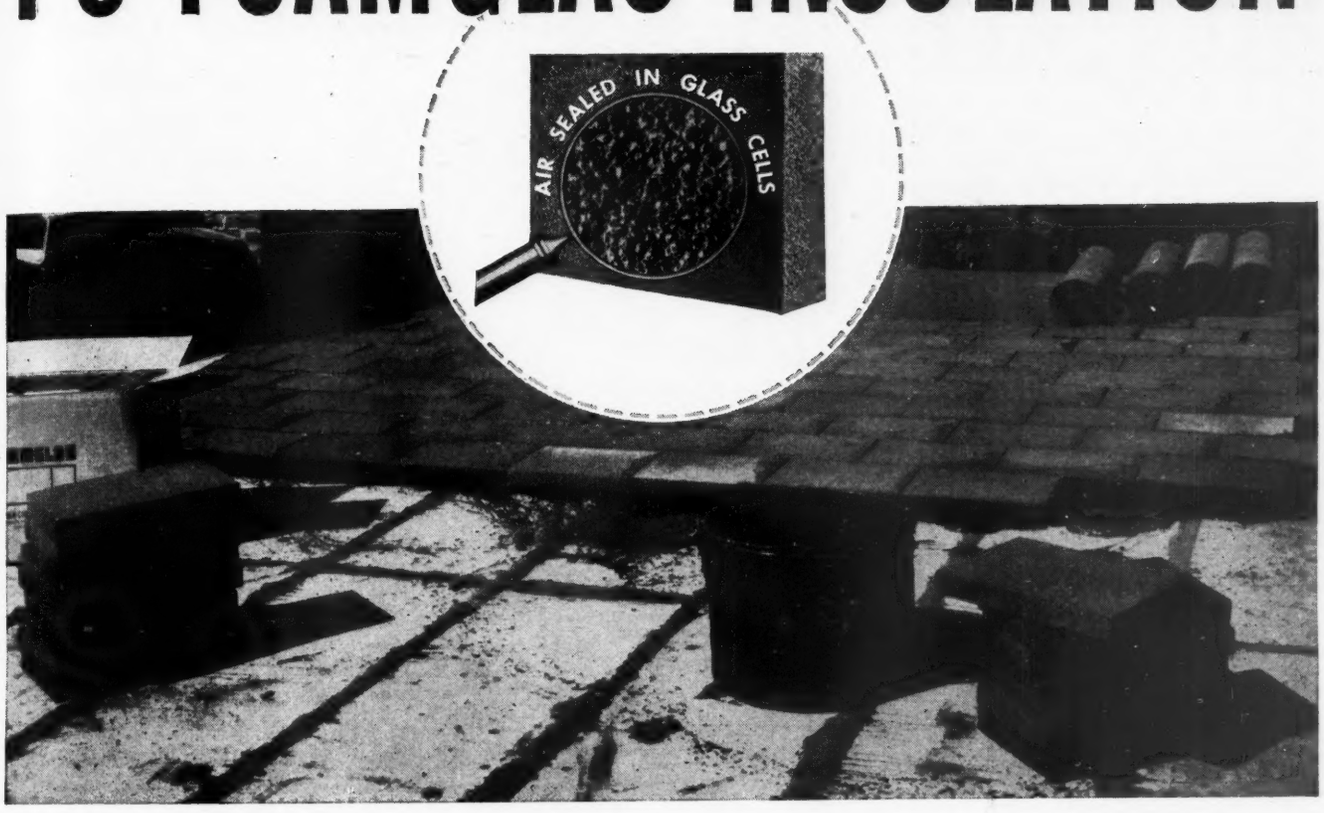
The state people differ with the Food and Drug Administration in three general categories. Food products sold in sirups, or other edible solutions, should be sold by the drained net weight according to the state officials. Mrs. America would then be able to purchase such common canned fruits and vegetables as cherries, peaches, and peas with full knowledge of the weight of the food she was buying. The declaration of net weight is acceptable to F&DA at present.

Certain items lend themselves to accurate measurements by volume or by net weight. State officials are on record in favor of permitting packers to use either method of stating the quantity. Mayonnaise,

"IT'S IN OUR 'SNAP, CRACKLE, POP' DEPARTMENT — DO YOU SUPPOSE— "

SAVE TIME AND MONEY WITH

PC FOAMGLAS INSULATION



AN important cost factor in insulating jobs is the labor cost of installing the insulating material. And men who have used many kinds of insulation can tell you that PC Foamglas is so light in weight, so conveniently packaged, that it can be installed more quickly by fewer men – saving both time and money.

PC Foamglas, the cellular glass insulation, is fireproof, waterproof and verminproof. It is unaffected by excessive humidity, impervious to common acids. It therefore retains its original insulating efficiency indefinitely, without repairs or maintenance. That means protection against the additional cost which is incurred when defective insulating material has to be torn up and replaced.

In walls and floors, on flat deck roofs, of all sorts of plants all over the country, PC Foamglas is helping to maintain desired temperature levels, to minimize condensation, economically, *permanently*.

You will find a lot of helpful information in our manuals on PC Foamglas insulation. Lavishly illustrated, they contain valuable engineering data, tables, charts and installation details. Check your choice on the convenient coupon, mail it to us and free copies of our booklets will be sent to you promptly, without obligation. Pittsburgh Corning Corporation, Room 200, 632 Duquesne Way, Pittsburgh 30, Penna.

· Also Makers of PC Glass Blocks ·

PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

T. M. REG. U. S. PAT. OFF.

LIGHT IN WEIGHT, rigid and strong, PC Foamglas is conveniently packaged for easy handling on the job. It can be installed quickly by minimum crews, thus saving time and labor cost.

Pittsburgh Corning Corporation
Room 200, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send me without obligation, your free booklets on the use of PC Foamglas insulation for:

Roofs_____ Walls_____ Floors_____

Name_____

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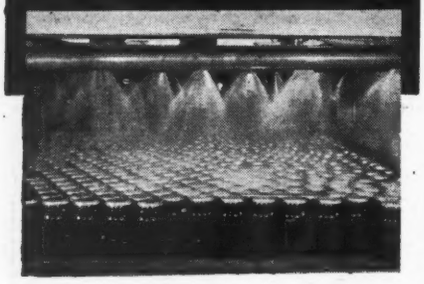
Get
POSITIVE AUTOMATIC CONTROL OF PASTEURIZATION
with the VORTEX



Vortex pasteurizers assure positive, accurate control of temperature and time, plus the advantage of completely automatic operation.

Thermal transfer is achieved through the medium of atomized water sprays, and temperature zones are designed with careful attention to heat reclamation so that consumption of steam is as economical as possible. Other design features include the patented "walking beam" conveyor, smooth hydraulic drive and a complete absence of gears, cams or chains.

Years of complete satisfaction are certain because of the durability of the design and measures taken to eliminate corrosion. It will pay you to get all the facts about the advantages of VORTEX machines for either pasteurization or cooling of foods. Send us your requirements and write for new technical bulletin.

BARRY-WEHMILLER MACHINERY CO.
1946 . . . Our 61st Anniversary
St. Louis, Mo., U. S. A.

strained honey, catsup, chili sauce, condensed soups and similar items in the viscous or semi-viscous classes are in this group. F&DA regulations do not permit measurement by volume.

Other items can be marked more accurately by showing the count as well as the drained net weight, or the net weight, as the case may be. Raw and canned oysters and clams and some fresh fruits and vegetables come in this category. Federal requirements are met by showing the volume including liquid in the case of fresh oysters. Canned clams and oysters must be marked with the drained weight which permits a preponderance of small sizes. Fresh grapes may be marked with net weight or by measure under federal regulation but only net weight under recommendation of the State officials.

Although the state weights and measures officials boisterously proclaim that they "cannot see eye to eye with the Administration (Food & Drug) in all decisions handed down for acceptable markings," there actually is no difference of opinion. Behind the scenes Food and Drug is giving them hearty support in any move that will add to the protection of the consumer. This actually extends outside of the Food, Drug and Cosmetics Act, to areas which the Federal people cannot touch. This is done through the promotion of limited number of standard paper and textile shipping bags for packaging beans, chemicals, feed, fertilizer, flour meal, cereals, nuts, salt, potatoes, rice, starch or sugar. Recommended sizes are 1, 2, 5, 10, 25, 50 and 100-lb. net weight capacities, with the exception of a 15-lb. bag for potatoes only.

Enactment of New Law Clips Agency Powers

THE first move of the more than 150 governmental agencies in Washington to conform with the recently enacted McCarran-Sumners Administrative Procedure Act was to issue a detailed statement of their organization and rules.

The new act forces the bureaus to blow away the smoke-screen of secrecy and vague language on their activities and powers and abide by established legal procedures. This first move will help businessmen figure out what agency does what, although to a lesser extent the Congressional Record does the same thing.

Next step, one that will hurt the regulatory agencies which exercise quasi-legislative and judicial powers, will be the announcement, by December 11, of the rules governing hearings made to conform with established legal procedures.

All of the reforms set up in the act must be in effect by next June 11, one year after the passage of the act.

The most important function of the McCarran-Sumners Act is the stripping of the regulatory agencies of their power to make arbitrary decisions which cannot be appealed in court. The act does this by lifting the Supreme Court stipulation that the lower Federal Courts limit their review of agency actions to constitutional and statutory questions.

Dehydrators Appoint Managing Organization

THE National Dehydrators Association, through its president, George E. Siebel, announced last month, the appointment of the Glenn G. Hoskins organization to manage its affairs and carry forward its postwar program.

The heavy wartime demands for dehydrated foods, Mr. Siebel explained, boosted annual production from 15,000,000 lb. to 270,000,000 lb. of dehydrated vegetables. Reconversion to peacetime production, in Mr. Siebel's opinion, emphasizes the need for a strong association to establish leadership toward the promotion of higher standards of quality.

The Hoskins organization has been active for the past several years in the macaroni, noodle, and dehydrated soup fields. The new headquarters will be at 520 North Michigan Blvd., Chicago.

Tin Plate Shipments To S. A. Approved

To insure enough tin plate for the food packing season in countries below the equator, the Civilian Production Administration will permit the Office of International Trade to license up to 55,000 short tons of tin plate for export in the first quarter of 1947.

Mose L. Harvey, director of CPA's Bureau of International Supply, said that this had been done to minimize the impact of tin plate orders on steel mill schedules. It is the government's policy to reduce tin plate exports during our canning season and increase them during the canning season in regions

NEW EDITION OF FIBERGLAS ELECTRICAL INSULATION MATERIALS CATALOG

Just off the Press

Anyone concerned with insulation for electrical, radio, electronic or video applications can use the Fiberglas Electrical Insulation Materials Catalog to advantage.

It contains complete information about the many forms of Fiberglas Electrical Insulation Materials. Indicates where and how to use this material to obtain its many advantages.

It describes the unique combination of electrically and mechanically important characteristics of Fiberglas, such as: resistance to high temperature, moisture and acid; favorable space factor and high tensile strength. It shows how the insulating impregnants increase the effectiveness of Fiberglas' inherent characteristics and add others such as high dielectric strength, insulation resistance and resistance to abrasion.

You will see why the use of this basic, inorganic, insulating material is increasing so rapidly—*why the swing is to Fiberglas.*

Be sure to have a copy of this new booklet in your file for ready reference. Write for copy today —there is no obligation. Owens-Corning Fiberglas Corporation, Dept. 2009, Toledo 1, Ohio.

In Canada, Fiberglas Canada Ltd., Toronto, Ontario.

OWENS-CORNING

FIBERGLAS

REG. U.S. PAT. OFF.

How to Control Syruping of Freestone Peaches . . .

Electrically controlling the syruping of freestone peaches with EXACT WEIGHT Scales, Fresh Frozen Foods, Watsonville, California.

do it the Exact Weight Way . . .

Once again enterprising production men from the west have come forth with another sound, profitable time saving packaging idea. This time it is electrically controlling the syruping of freestone peaches, for quick freezing. Actually the methods used are very simple and consist of straight line conveyors, high-speed end tower EXACT WEIGHT Scales with electrical attachment for syruping by weight. Although EXACT WEIGHT Scales are used in hundreds of food operations, from ingredient compounding to final packaging for uniformity this is probably the newest and most novel use our equipment has been put to. No matter what you handle in the food field, whether you can, freeze or dry package there is an EXACT WEIGHT Scale for every operation. Write for details for your business.

EXACT WEIGHT Scale Model #213—Features (1) high speed operation due to extremely short platter fall (⅛") (2) end tower location which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision. 1 lb beam, notched type. Dial 1 oz over and under X¼ oz graduation—Capacity to 3 lbs

INDUSTRIAL PRECISION

Exact Weight Scales

THE EXACT WEIGHT SCALE COMPANY

21 W. FIFTH AVE. COLUMBUS 8, OHIO

Dept. T, 783 YONGE ST. Toronto 5, Canada

below the equator, such as South Africa, Australia and Latin America.

"All of this tinplate is used for the preservation of perishable food, a large part of which moves into the devastated areas of Europe and Asia, thereby helping to remove some of the pressure on our own food supply," Mr. Harvey said.

Damage Claims

THE Grocery Manufacturers Association, New York, has a record of over 20,000 claims for damages against the food industry, many of them fraudulent. These records may be consulted by nonmembers of GMA, who may feel they have a fraudulent claim on their hands.

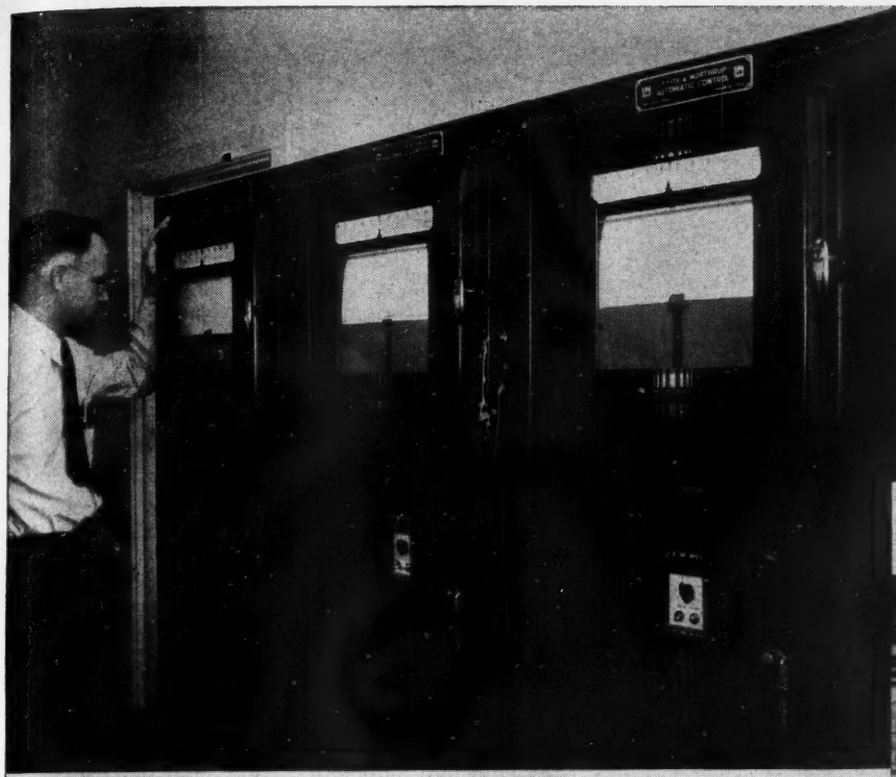
When informing GMA of these claims, President Paul S. Willis emphasizes the importance of specifying the necessary details, such as the name and address of the claimant, the doctor and lawyer involved, the kind of food and the nature of the complaint.

Meat Board Out

ANNOUNCEMENT that the USDA Meat Board had been discontinued was the direct result of the curtailment of government meat procurement activities following the close of the war. This brings a return of the prewar pattern for the purchase of food stuffs by the armed services, UNRRA and other agencies of government, both foreign and domestic. With but few exceptions, these buyers now will deal direct.

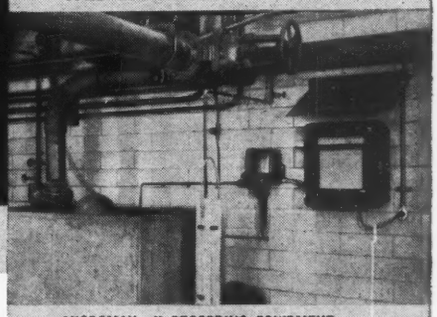
Package Machinery

GEORGE W. VON HOFE, president, New Jersey Machine Corporation, Hoboken, was elected president of the Packaging Machinery Manufacturers Institute, at the fourteenth



RECORDING pH OF PAPER STOCK, WITH MICROMAX INSTRUMENTS, IS A STANDARD PART OF QUALITY CONTROL IN THE PLANT OF MOSINEE PAPER MILLS COMPANY

MODEL R MICROMAX FOR pH OF HOT WASH LIQUOR AFTER CHAR FILTERING, NATIONAL SUGAR REFINING COMPANY



MICROMAX pH RECORDING EQUIPMENT, DUQUESNE LIGHT COMPANY

CONTROLLING pH OF WASTE WHICH MAY BE EITHER ACID OR ALKALINE, BAKELITE CORP.

MICROMAX pH CONTROL APPLIED TO RAW WATER, CLUETT PEABODY COMPANY

pH INSTRUMENTS

To Match Most Needs

As pH problems in plant and laboratory grow in number and importance, the Micromax family of instruments for recording and automatic control is increasingly depended on to meet requirements, with accuracy and dependability.

Most popular Control equipment is a Strip-chart Micromax with its own electric valve-drive, and with glass electrode selected for the particular situation. This instrument requires absolutely minimum attention, because it has the unique feature of standardizing itself, and its supplies of chart and ink last for a month or more at usual operating speeds. Its wide chart and rectilinear coordinates appeal strongly to the record-minded engineer.

For highest visibility, plus a circular chart, the Round-chart Micromax is used. Its record is outstanding among circular charts because its radial lines are perfectly straight, and thus really easy to read.

If you will send a chemical engineering description of pH conditions in your lab or plant, we can probably recommend specific instrumentation. Or request Catalog N-96(1), if you prefer.

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA. 44, PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

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VIKING PUMPS

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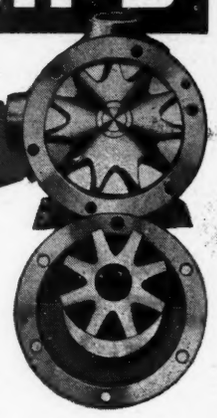


For YOUR *Inspection*

Know VIKING PUMPS and you know why they are rugged . . . simple . . . dependable. There are no blades, springs, gadgets, timing gears or a mass of other devices required to make them work or help improve and retain efficiency.

The VIKING is simple . . . just 2-moving "gear within a gear" parts make up the pumping principle. That is why they work so well for pumping any liquid or semi solid food product. They are self priming without pulsation . . . deliver against discharge pressures up to 50 - 100 - 200 - or 500 psi. depending upon construction and applications.

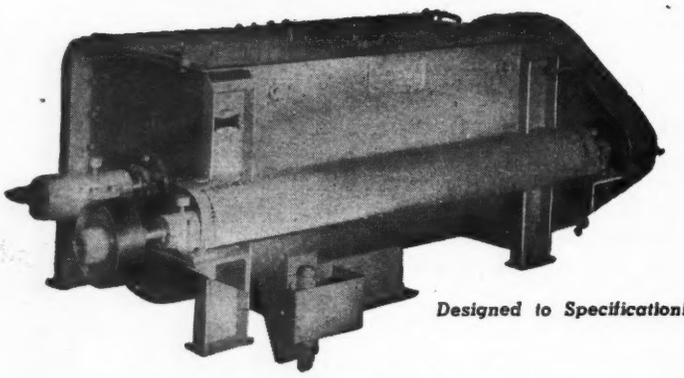
Know VIKINGS and what they can do for you. Send for free bulletin 103E today.

See Our Catalog In SWEETS

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

MIXERS

HORIZONTAL or VERTICAL



Designed to Specification!

CAPACITIES FROM 1 TO 234 CU. FT. PER CHARGE

Agitators built to relieve end load on bearings. Center inlet and discharge gates. Covers flush or sealed. Outboard roller bearings. Packing glands on mixer body. Robinson Processing Equipment designed by experienced engineers. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

annual meeting of the Institute, held recently at Shawnee Country Club, Shawnee-on-Delaware, Pa.

Vice Presidents elected were Boyd H. Redner, general manager, Battle Creek Bread Wrapping Machine Company, Battle Creek, Mich. and Oscar W. Wikstrom, president, United States Automatic Box Machinery Co., Boston.

Mr. von Hofe succeeds Frank B. Fairbanks, president, Horix Manufacturing Company, Pittsburgh, who has served as the Institute's president for two years.

PROCESSING

Novel Salvage Method Saves Tainted Meat

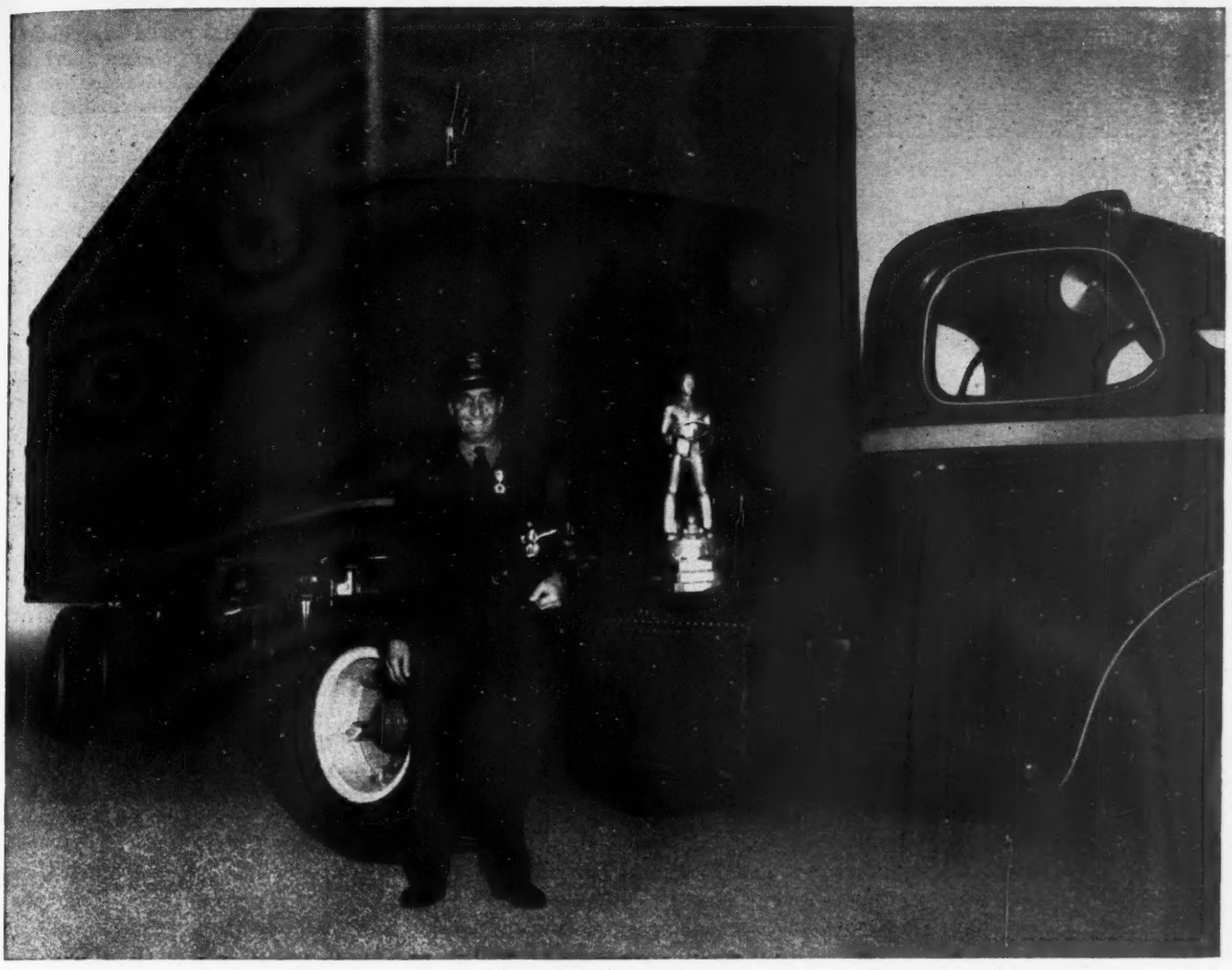
MEAT valued at about $600,000, which had been condemned following a recent fire at meat works in Queensland, Australia, was uniquely salvaged by using cartons from gasmasks.

The frozen meat had been condemned because it had been tainted by ammonia from the freezing chambers. Salvagers obtained 1,000 gas mask containers containing activated charcoal. Hot air jets softened the skins and the gasmask containers were hung near while a draft of air was circulated through the chambers. The activated carbon absorbed all foreign odor and Commerce Department inspectors passed the meat as first grade.

Set Hearing to Amend Canned Peas Standard

A FOOD standards hearing to consider amending the canned peas standard of identity will be held November 6. Petitions have been received from 22 pea canners to use the Stevenson process for retaining the natural green color of peas by addition of small quantities of alkaline ingredients. The hearing will be in Room 5545 of the Social Security Building, Washington, D. C., commencing at 10 a.m. Edward E. Turkel has been designated as presiding officer, and affidavits may be submitted in lieu of oral testimony.

The Stevenson process has been developed by Continental Can Company and uses a combination of sodium carbonate, calcium hydroxide and magnesium hydroxide, or a combination of sodium and magnesium hydroxides to bring the finished product to a hydrogen ion concentration not over 8. Label dec-



C. W. Zimmerman Wins '46 ATA Roadeo Championship with TRAILMOBILE

Displaying championship form in every maneuver demanded by the many nerve-racking, driving problems laid out by ATA officials, Charles W. Zimmerman, using a Trailmobile Van, won the coveted National Roadeo Championship in Chicago.

Furthermore, the whole trucking industry can be proud of Zimmerman's amazing record of driving thirteen straight years, over one million miles, without an accident.

"Chuck," as he is known to his friends, also won the National Roadeo Championship in 1940, and drives for the Cushman Motor Delivery Company of Chicago.

After winning the title, Zimmerman was asked why he used a Trailmobile when the "chips were down" in the Championship finals. "Chuck" answered that a Trailmobile "handles" easily and well, and is extremely maneuverable, which is very important in executing the driving problems in this competition.

Trailmobile joins the entire trucking industry in heartily congratulating the 1946 Roadeo Champion for his outstanding driving performance and his unusual safety record.

THE TRAILMOBILE COMPANY
Cincinnati 9, Ohio

The Trend is to TRAILMOBILE

Design for Food Packaging

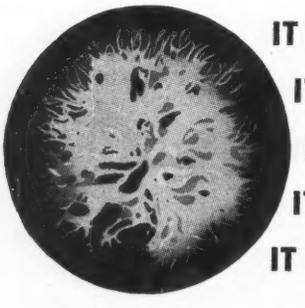
Can we help you plan the packaging for the new products you are going to bring out — or restyle and modernize the packaging of your present products? . . . Our Design and Sample Department is now doing much forward work on *Folding Cartons* and *Shipping Containers* even though shortages of raw materials and equipment unfortunately prevent us at the moment from taking on new business.

HUMMEL & DOWNING COMPANY
MILWAUKEE 1, WISCONSIN

WASTE PAPER IS A VITAL RAW MATERIAL . . . SAVE IT . . .

Something New Under the Sun

. . . A UNIVERSAL COLLOID AGENT



IT THICKENS . . .
IT GELS . . .
IT EMULSIFIES . . .
IT STABILIZES . . .
IT SUSPENDS . . .

We are now producing from Carragheen two new improved types of gelose. One of them should be the answer to your emulsifying, suspending, thickening or stabilizing problems.

KRIM-KO GEL is an all-purpose colloid-assistant. Properly used, it has been proved effective in many of the most exacting food, pharmaceutical and industrial applications.

CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

Send for free liberal working samples for experimental use.

KRIM-KO Corporation
SEAPLANT PRODUCTS DIVISION
NEW BEDFORD, MASS.

laration of these added ingredients would be covered by the now permissible "traces of alkalis added" or by specifically naming the alkalis actually used.

Applications from a number of the petitioners have proposed a third alternative combination of alkaline ingredients, without referring specifically to the Stevenson process by name. These would be sodium carbonate and/or sodium bicarbonate, together with magnesium carbonate or magnesium oxide. All applications cite the Blair process (developed by American Can Co.) which has already been approved, and claim that the Stevenson process is for the same purpose but with superior performance.

Beef Loses Flavor If Aged Before Freezing

CONTRARY to popular belief, beef aged before freezing tends to lose its flavor faster during frozen storage than unaged beef.

This finding was introduced at the recent meeting of the American Chemical Society in Chicago, where a series of meat-aging experiments were reported on in a paper entitled "A Study of Beef Aging in Relation to Freezing," by the Kroger Food Foundation and Frigidaire Division of General Motors.

"Results of tests indicate that the flavor of aged beef deteriorates more rapidly while in frozen storage than that of unaged beef," the paper summarized. "This is also true of beef aged under ultra-violet

(Wide World)

JAP THANKSGIVING

The Japs liked the emergency flour, even if we did not. They pushed "Billiken," the god of plenty, around the streets of Tokio on this flour sack draped float by way of celebrating a new food shipment from—of all places—The United States of America.

NOTICE!

TODAY is not one day too early to get your order in for Taylor Instruments for next season's pack . . . so you can have them installed and working right before the rush begins. It's good business and smart insurance for you to sit down right now and review next season's instrument requirements with your Taylor Field Engineer. Last minute demands are difficult to meet and are bound to cause some disappointments. We don't want this to happen and neither do you. So order those instruments *now!* Drop us a line here in Rochester or call your Taylor Field Engineer.

NOTE: ***Complete repair service on your present Taylor Instruments is now available at our Rochester plant and at San Francisco, Tulsa and Toronto.***

TAYLOR INSTRUMENT COMPANIES

ROCHESTER, N. Y., AND TORONTO, CANADA

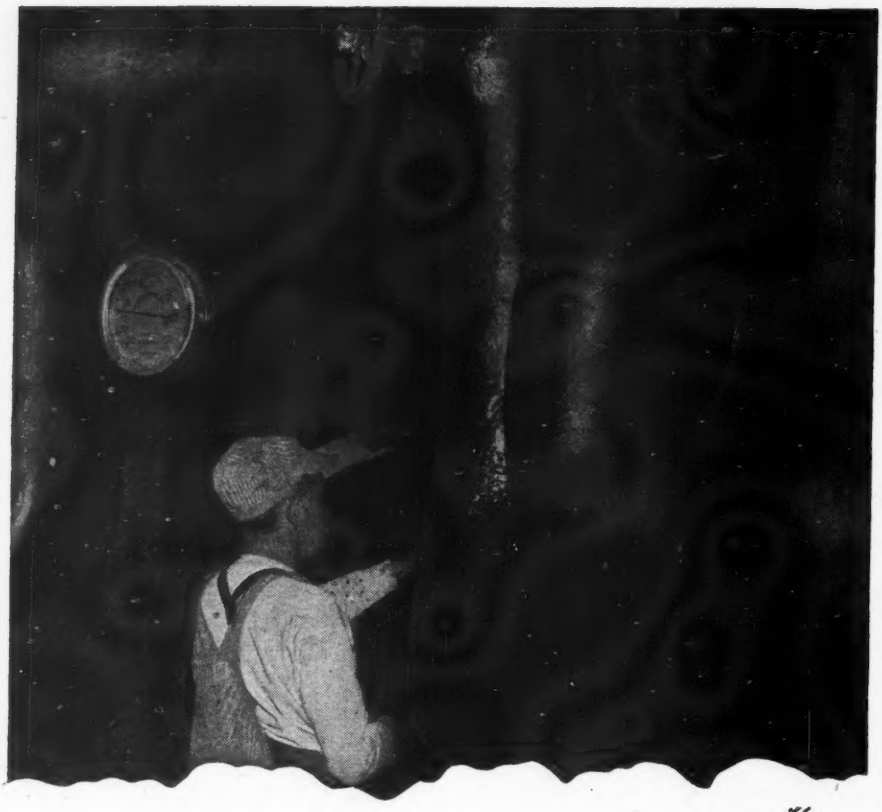
Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY



For Insulation Jobs, too

IT HAS TO BE RIGHT THE FIRST TIME

When it comes to insulations, "nearly right" is wrong!

That's why it pays to get J-M Rock Cork . . . standard of the refrigeration industry for years!

Basically mineral in composition, Rock Cork has low thermal conductivity, plus high resistance to moisture, vermin and rot.

Remembering that insulation will only render its maximum efficiency when properly applied, Johns-Manville also offers an application service of skilled construction units. These units are organized to handle every detail of your insulation requirements from plans to finished job.

For details about Rock Cork, write for brochure DS-555, or get in touch with your J-M Insulation applicator. Johns-Manville, Box 290, New York 16, N. Y.

JOHNS MANVILLE JM PRODUCT

Johns-Manville ROCK CORK

rays and beef aged for 240 hours at customary aging temperatures. All beef in this study, regardless of aging treatment, lost flavor after six months of frozen storage."

QMC Research on Food Aided by 80 Colleges

IN an intensive food research program, 80 colleges, universities and other agencies throughout the United States are collaborating with the Quartermaster Corps to improve the properties of foods and rations. The center of this comprehensive program is the Food and Container Institute, at Chicago.

Their objectives are to evaluate and improve the nutritional and physiological adequacy as well as the acceptability of rations for use under various operational conditions; to improve the functional characteristics of food; and to investigate the chemical and microbiological factors and methods for their control which affect the stability of foods and rations.

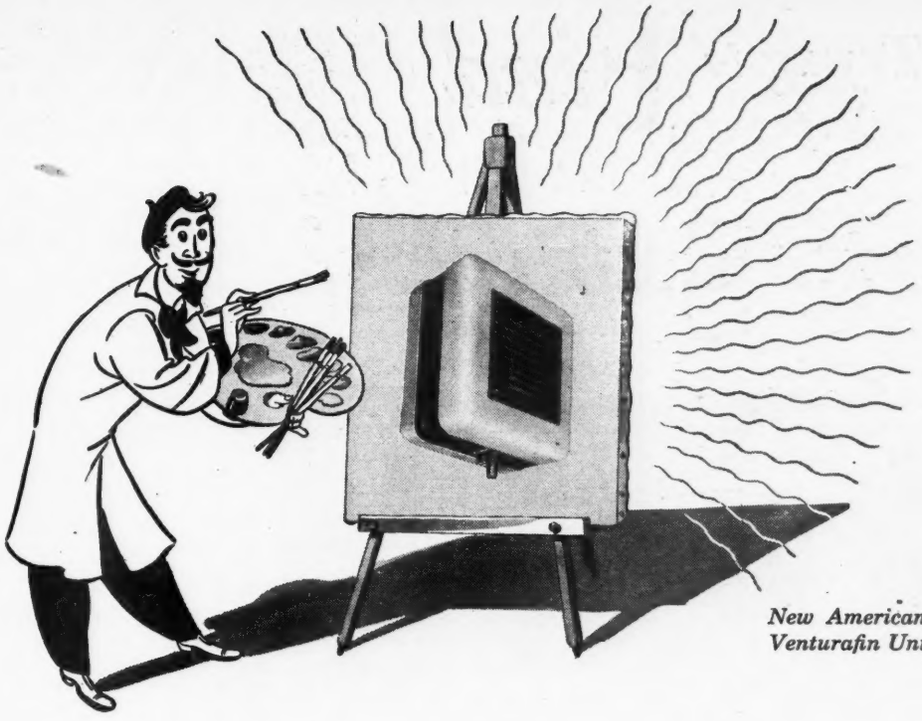
The program is under the sponsorship of a Committee on Research, headed by Dr. Emil Mrak, associate professor in the division of food technology, University of California, and includes Dr. W. F. Geddes, chief, division of agricultural biochemistry, University of Minnesota; Dr. H. E. Longenecker, dean of the graduate school, University of Pittsburgh; Dr. George F. Stewart, research professor, poultry husbandry, Iowa State College; Dr. George Gelman, technical director of the Quartermaster Food and Container Institute of the Armed Forces and Dr. M. L. Anson, director of chemical research, Continental Foods, Inc.

Train Bakers

THE Quartermaster Food and Container Institute has initiated an Army master bakers course to train men for supervision of bakeries at posts, camps, and stations. The course consists of eight weeks training in bakery management, practical experience in the Institute's model bakery, and field trips through modern commercial bakeries. Influence of climatic and atmospheric conditions on formulas will also be emphasized.

Dairy Conference

Dairy Manufacturers Conference, sponsored by the University of Illinois, division of Dairy Manufacturers, in cooperation with the Division of University Extension, will be held Nov. 5, 6 and 7, at Urbana,



New American Blower Venturafin Unit Heater

We dolled up Industrial Unit Heaters!

For many years, industrial heating was both a "headache" and an "eyesore."

American Blower engineers cured the "headache" before the war by greatly increasing the range and efficiency of Unit Heaters, and eliminating needless noise in operation.

Now, we have greatly improved the appearance of industrial unit heaters—made them fit the architecture and environment of the most modern offices, factories, stores, garages, etc.

Phone your nearest American Blower Branch for information about the new, improved Unit Heaters for wall, floor or ceiling mounting. Ask also about any other air handling equipment you may require, and about Gyrol Fluid Drive for the smooth transmission of power or stepless variable speed control.

AMERICAN BLOWER

AMERICAN BLOWER CORP., DETROIT 32, MICH.

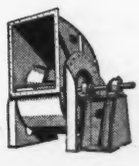
Division of American Radiator & Standard Sanitary Corporation

4 Years of War-Stimulated Improvement—On Top of 61 Years of Engineering Development

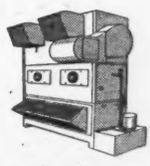
Heating Equipment

Ventilating Equipment

Gyrol Fluid Drive



Industrial Fans



Air Conditioners

Dust Collectors

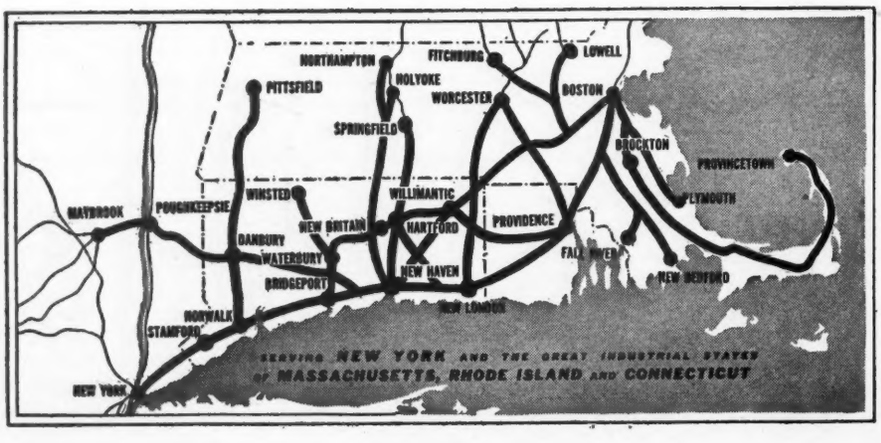
Trying to Find Parts Suppliers?

13,403 manufacturers are located in Southern New England.

If it's made out of metal, chemicals, fiber, wood, plastics or almost any other material, you won't have far to look in Southern New England. Here 13,403 manufacturers produce over 200 distinct classes of goods . . . nearly two-thirds of all types in the nation.

Easy access to parts suppliers is just one of many factors in your favor when you locate your plant in the compact industrial area served by The New Haven Railroad. For a complete, concise resume of all the advantages, write for a copy of the new 32-page booklet, "SOUTHERN NEW ENGLAND FOR TOMORROW'S INDUSTRY." Address: P. E. Benjamin, Mgr., Industrial Development, New Haven Railroad, Room 201K, 80 Federal Street, Boston 10, Massachusetts.

THE NEW HAVEN R. R.



Ill. The program has been designed to meet the educational needs of individuals connected with milk and dairy products plants and related industries. Topics of particular interest to field men will be presented on the first day. Recent research progress will also be discussed. Speakers include men from the University of Illinois staff and from other universities as well as leaders in the industrial field.

Engineering Congress Looks to World Group

TWELVE hundred of the world's leading engineers, drawn from all trades and from thirty countries (including the U. S.), met in an International Technical Congress in Paris recently. They exchanged information in a dozen languages, visited industrial plants, and listened to speeches—in French and English—on the present and future tasks of engineering on this globe.

Chief result of the Congress occurred on the sidelines—the unanimous decision by the chief delegates from all countries to set up an interim organization with the view that this will grow into a World Engineering Federation.

The proposed Federation would mobilize the engineering knowledge of the world to aid the various United Nations bodies in such tasks as reconstruction, economic advancement, and the spread of engineering knowledge and cooperation. This idea grows out of meetings held in London, as early as 1944, among engineers of various nations who were assembled there by the war.

Research Funds

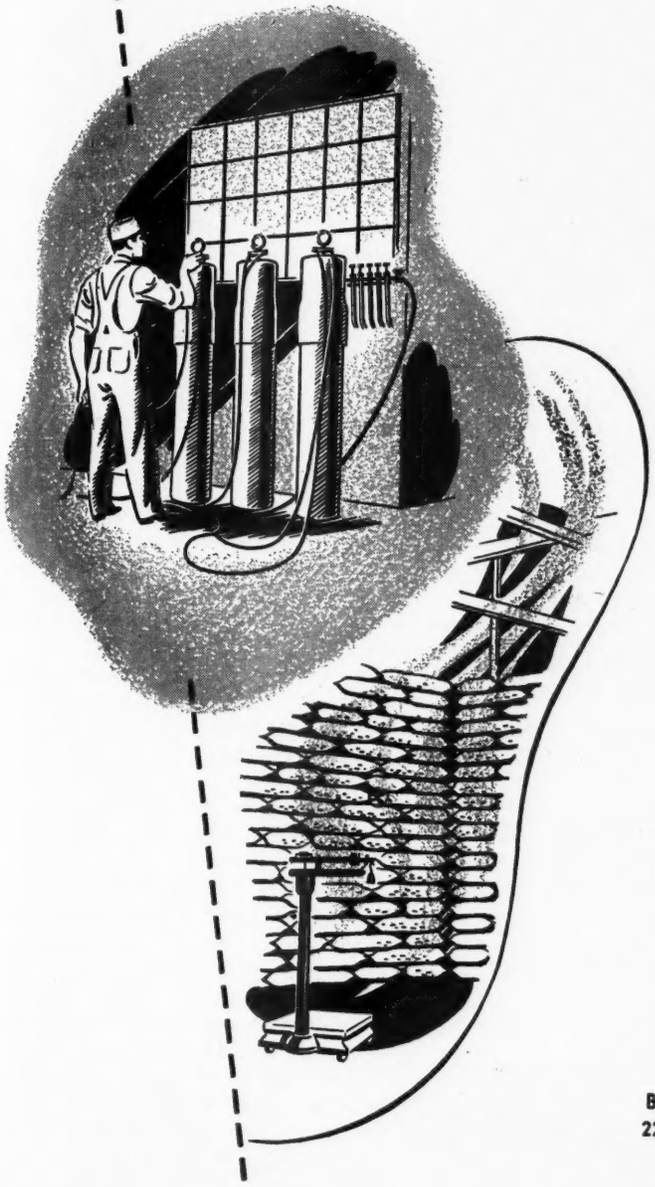
APPROPRIATIONS for research and development in the U. S. Army, for 1947, included $2,500,000 for the Quartermaster Corps, of which $700,000 is earmarked for research on subsistence. Total Army research appropriations came to $281,500,000.

Candy Salesmen

THE distribution committee of the National Confectioners' Association has established a confectionery industry sales training program with the cooperation of candy manufacturers and wholesalers.

Prominent candy manufacturers, wholesalers and manufacturers' salesmen will be appointed throughout the U. S. to assist in organizing the training classes.

THE PROVEN METHOD OF PEST CONTROL IS YOUR BEST PROTECTION



Results show LIQUID HCN is one of the most powerful fumigants commercially available for destroying rodents and all types of insect pests—*in all stages of their development.*

LIQUID HCN leaves no survivors, because it has the remarkable ability to penetrate every crack, crevice, and other hiding place in your mill and machinery. It also penetrates flour, grain, cereal and many similar food products, killing insects and destroying their eggs, yet leaves no odor or taste, and *does not affect the baking qualities of flour.* Correct fumigation with LIQUID HCN obtains maximum kill at minimum cost for your mill and assures full protection and saleability for your products.

Investigate the advantages of LIQUID HCN *today.* Consult an experienced Industrial Fumigation Engineer and find out how this efficient fumigant can solve your pest control problem. If you don't already know a good firm in your area, write us and we shall be glad to recommend one. You incur no obligation.

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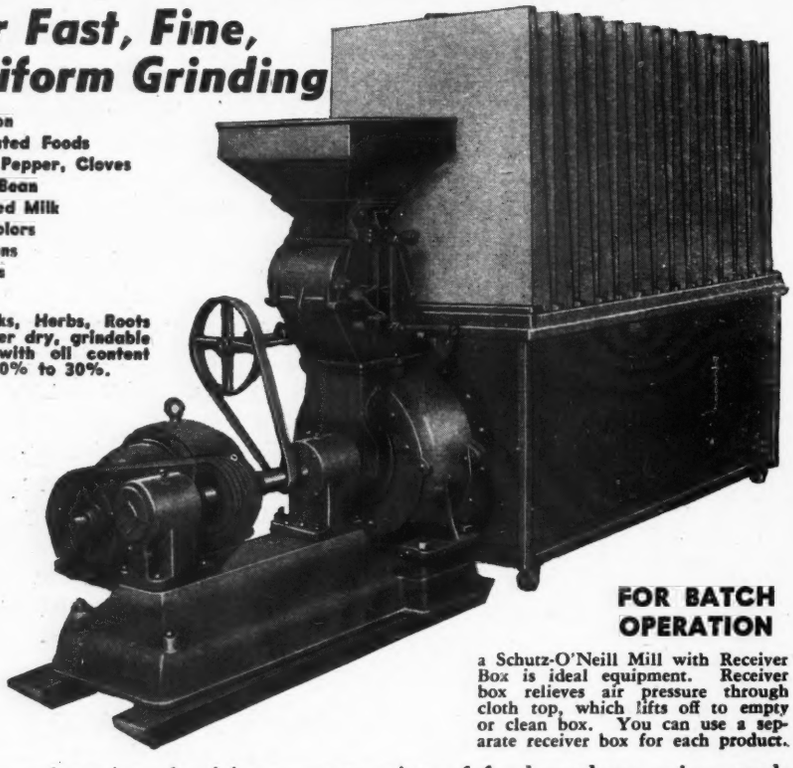
Specify SCHUTZ-O'NEILL PULVERIZERS

For Fast, Fine, Uniform Grinding

Cinnamon
Dehydrated Foods
Cocoa, Pepper, Cloves
Vanilla Bean
Powdered Milk
Food Colors
Soy Beans
Starches

All Barks, Herbs, Roots and other dry, grindable stocks with oil content up to 20% to 30%.



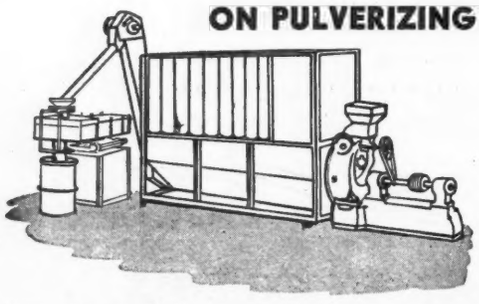
FOR BATCH OPERATION

a Schutz-O'Neill Mill with Receiver Box is ideal equipment. Receiver box relieves air pressure through cloth top, which lifts off to empty or clean box. You can use a separate receiver box for each product.

For general use in pulverizing a great variety of food products, spices, seeds and similar materials, the Schutz-O'Neill Pulverizers are unexcelled. The principle of centrifugal air force impact is fast, produces a uniform product, and will maintain relatively high outputs for superfine grinding up to 400 mesh. For products with high moisture or oil content, Schutz-O'Neill also has efficient and proven equipment. Schutz-O'Neill Pulverizers are made in 12", 16", 20", 22", 24", and 28" sizes, with capacities ranging up to 2000 lbs. per hour, depending upon kind of material and fineness desired.

Consult Schutz-O'Neill

ON PULVERIZING PROBLEMS



Mill Plan 45—Mill, expansion Tubular Collector, Elevavtor, Gyrator Sifter.
An efficient set-up for continuous operation.

Schutz-O'Neill has a great variety of Mill Plans for different purposes. If you will write us your requirements, products to be pulverized, output desired, and send a sample, Schutz-O'Neill engineers will recommend the correct size and type of mill and the most efficient Mill Plan for your use. This in no way obligates you. Literature on request.

ESTABLISHED 1893
SCHUTZ-O'NEILL CO. DIVISION OF PARTEN MACHINERY CO
PULVERIZERS · BREAKER MILLS · ROLLER MILLS · BURR MILLS · HAMMER MILLS
305 SIXTH AVENUE SOUTH • MINNEAPOLIS 15, MINNESOTA

DISTRIBUTION

Sugar Content No Bar In Decontrol of Food

SPECIFIED frozen fruits and fancy grades of canned fruits, subject to price control only because they contain 20 per cent or more of sugar, have been exempted by OPA.

Removal was necessary, OPA explained, because when the short supply list was issued, September 1, by the Secretary of Agriculture, it provided that any processed item containing 20 per cent or more of an item certified in short supply was automatically declared to be in short supply. As a result even though frozen fruits were not included in the short supply list since sugar was listed, those frozen fruits and some fancy grades of canned fruits containing more than 20 per cent sugar were still subject to price control.

Meat Institute Looks At Supply Prospects

PROBLEMS of livestock production and the future availability of meat, feed, fats and oils, as well as research projects under way in the Institute, were discussed at the forty-first annual meeting of the American Meat Institute.

L. J. Norton, professor and acting head of the Department of Agricultural Economics, University of Illinois, pointed out that as movement from pastures and ranges make increased marketing necessary, cattle will move in greater volume. All of the cattle that stop on the way to slaughter to be fed available feed, means more beef eventually. Out of this movement of cattle from pasture and range and from surplus dairy stock, a considerable tonnage of beef should be available later this year.

The price of corn at country points may be relatively low in relation to terminal market prices because of shortages of freight cars. This lower price will encourage feeding. Beef production in 1947 will be no more than 5 percent under the 1945 peak. Accordingly, there will be 6 to 7 percent more beef than in 1946 and a larger part of this will flow in domestic channels because of the reduction of Army and export needs. On a per capita basis, about 12 percent more beef will be available for consumption than in 1945.

Forty percent of our corn crop is

"The bigger the family—the better the service"

CONTINENTAL CAN COMPANY, INC.

PAPER DIVISION

PAPER DIVISION Headquarters
330 W. 42d St., New York 18, N. Y.

MONO NESTED AND CYLINDRICAL CONTAINERS

COMBINATION PAPER-AND-METAL CANS

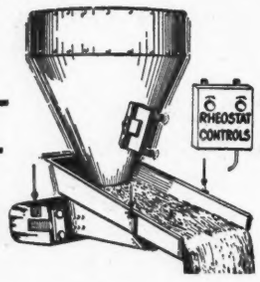
FIBRE DRUMS The Container Co., Van Wert, Ohio

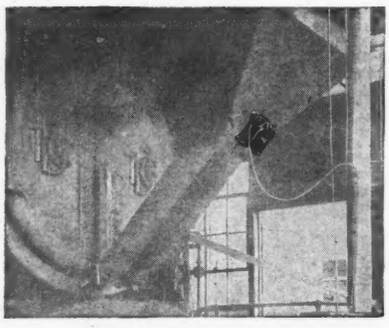
Sales offices in all principal cities

An afternoon "pick-me-up" is quick, sanitary and convenient when packaged in paper containers made by Continental Can Company's Paper Division. These containers come in a variety of sizes and styles for hot drinks, and for hot and cold moist foods.

At the moment, demand exceeds supply. But we're doing our best to uphold our policy—"best in *quality*, best in *service*." And remember, in addition to Mono nested and cylindrical containers, our Paper Division also makes fibre drums, and paper-and-metal cans.

MOVE MATERIAL *the Easy Way*
with SYNTRON





"Pulsating Magnet"

ELECTRIC VIBRATORS

Assuring free-flowing bins, hoppers and chutes. Prevent arching and plugging. Eight models—for all sizes and shapes of bins.

"Vibra-Flow"

VIBRATORY FEEDERS

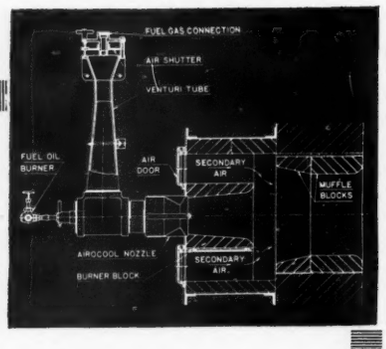
Controlling the feed of bulk materials—hot or cold, dry or damp, a fine powder or big lump—to processing equipment.

Write for literature

SYNTRON CO.

460 Lexington Homer City, Pa.

NATIONAL AIROIL FUEL OIL · GAS BURNERS



TANDEM COMBUSTION UNIT

Maintains a High Flame Temperature

with FUEL OIL or GAS

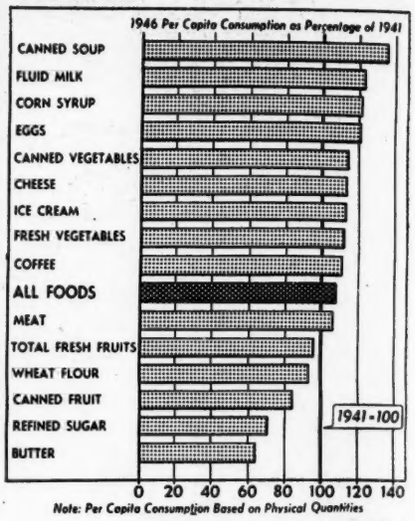
The Tandem Combustion Unit is ideal for burning liquid or gaseous fuels in all types of boilers and process furnaces.

It maintains a high flame temperature on either fuel; is easily "lighted off" in a cold furnace and can be brought, quickly, to full capacity with a clean flame. It has a high turndown ratio with a steady flame; is readily adjusted to a wide capacity range; is economical with fuel. The flame can be directed to uniformly radiate heat to the absorbing surfaces without flame impingement.

Write for further information about the Tandem Combustion Unit illustrated at right,—and the other combination units that are available.

NATIONAL AIROIL BURNER CO., INC.

Main Offices & Factory: 1272 EAST SEDGLEY AVENUE, PHILADELPHIA 34, PA.
Texas Office: 2nd National Bank Bldg., Houston



(Press Association)

WE STILL EAT

If you have been wondering where all the food is going to this chart might help find the answer. The black vertical line represents 1941 per capita consumption. We seem to be doing well especially on soup.

fed to hogs. The September crop report shows an inventory of 3,600,000,000 bu. of corn, including a carry-over on October 1. The supply of corn is 250,000,000 bu. larger than last year. Since pork production depends greatly upon feed supplies, marketings of hogs as well as their weight should be fairly heavy by December 1.

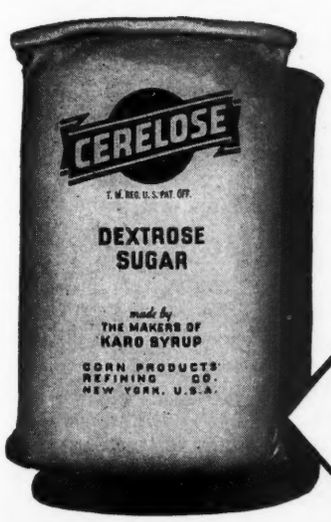
The average weight of hogs, marketed in 1944, was around 240 lb. Mr. Norton believes that the total slaughter of hogs for the 12 months beginning October 1, will be 6 to 8 percent less than a year earlier, but with the weights averaging a little heavier this year.

The spring pig crop of 1947 should be 10 to 15 percent over the 1946 crop, if the corn crop yields up to expectations and the hog prices increase with the lifting of the ceilings.

Total marketings of lamb and mutton will not be reduced quite so much in 1947 because there will be a continued reduction in numbers of breeding sheep. Total meat production in 1946 will be about 6 percent less than in 1945. In 1947, production will be at about the 1945 level.

John F. Krey, vice president, Krey Packing Co., St. Louis, quoting from a recent government crop report, stated that feed-grain production will be about 127,000,000 tons; 4 percent above the previous high mark set in 1942. So the nation will apparently shift from critical feed shortages to an abundance of feed. This means that feed prices will drop.

Year after year...



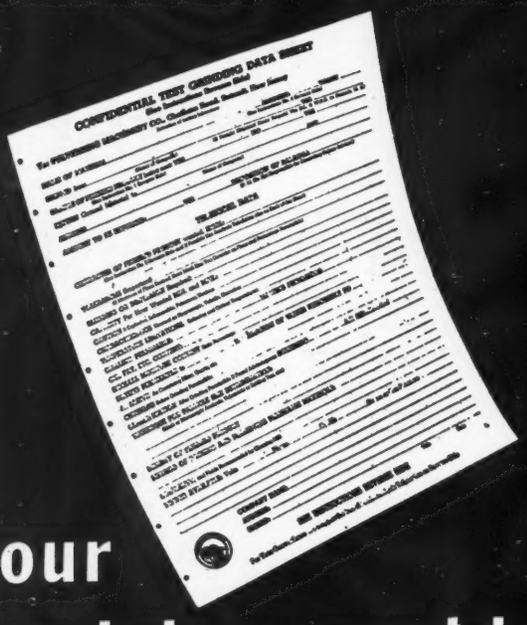
Year after year extensive advertising has hammered home the facts about dextrose. Today 8 people out of 10 know what it means when the label says . . . "rich in dextrose."

CORN PRODUCTS SALES CO.
17 BATTERY PLACE NEW YORK 4, N. Y.

rich in dextrose

CERELOSE *is* **dextrose**

A practical approach



to your Pulverizing problem

WHEN you need finer grinding; when more uniform particle size or more thorough dispersion of your pulverized material will improve your finished product—if you feel your milling costs are too high—we invite you to take what many concede is the most practical first step toward the solution of a pulverizing problem.

Let us send you our Confidential Test Grinding Data Sheet. It is especially designed for your convenience in supplying all the pertinent information required for a competent analysis of your problem. Upon receipt of it and a working sample of your material, we can make available to you, without obligation, the facilities of our Laboratory and Test Grinding Department.

There, an actual grinding test on your sample, will, with the aid of this confidential test information, provide for a complete recommendation as to the indicated answer to your problem, and the type of equipment needed. This offers you a sound basis upon which to plan your production operations. Send for your Data Sheet today.

SEND FOR

—your copy of the new 48-page illustrated M'KRO-PULVERIZER and MIKRO-ATOMIZER catalog just issued. Contains the latest information on the improved production of fine and ultra-fine powders through mechanical pulverization.

PULVERIZING MACHINERY COMPANY

97 CHATHAM ROAD • SUMMIT, N. J.

NOW . . . 2 TYPES TO MEET MOST PULVERIZING NEEDS

MIKRO-PULVERIZER (FINE)

MIKRO-ATOMIZER (ULTRA FINE)

Reg. U. S. Pat. Off.

President Wesley Hardenbergh, told of plans now under way for a study of the economics of the meat industry with specific emphasis on the relationship between farm income and spendable consumer income and the supply of meat of various types and cuts. This study is being made in cooperation with the Department of Agricultural Economics of the University of Illinois.

Dr. H. R. Kraybill, director, Department of Scientific Research, American Meat Institute, revealed that research studies on the development of a bland lard with improved physical properties involve the use of a suitable antioxidant. The cost of stabilizing lard is 55 cents per 100 lb. of lard, if 0.01 percent nordihydroguaiaretic acid (NDGA) is used at the present market price of $55 a pound. If 0.005 percent of either citric or phosphoric acid is added with the NDGA to lard, just as good keeping qualities can be obtained when only 1/5 to 1/7 as much NDGA is added. Cost of refining 100 lb. of lard is then reduced from 55 cents to less than 10 cents. There is still need for an economical antioxidant which will carry through into the baked and fried foods and which will dissolve readily in fat. Such an antioxidant is now under thorough test by the Federal Meat Inspection Division.

Officers elected at the meeting include: chairman of the board, John F. Krey, Krey Packing Co., St. Louis; president, Wesley Hardenbergh, re-elected; secretary and treasurer, H. Harold Meyer, the H. H. Meyer Packing Co., Cincinnati.

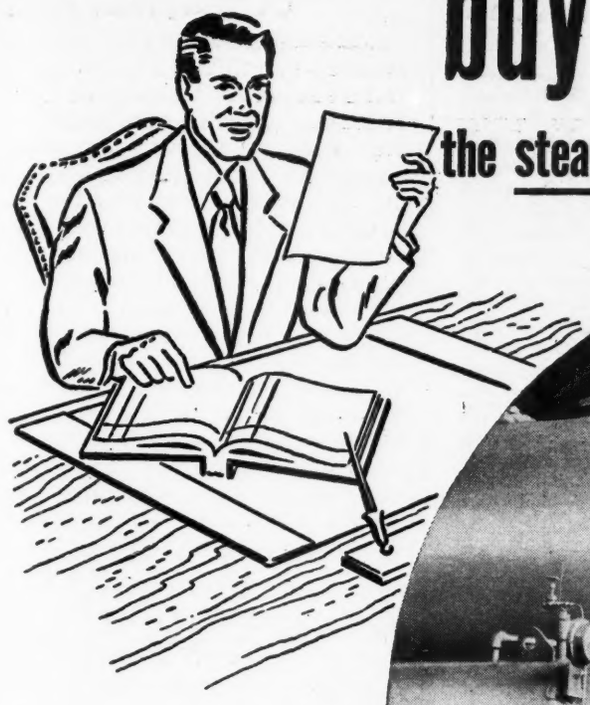
QMC Testing Frozen Chicken a la King

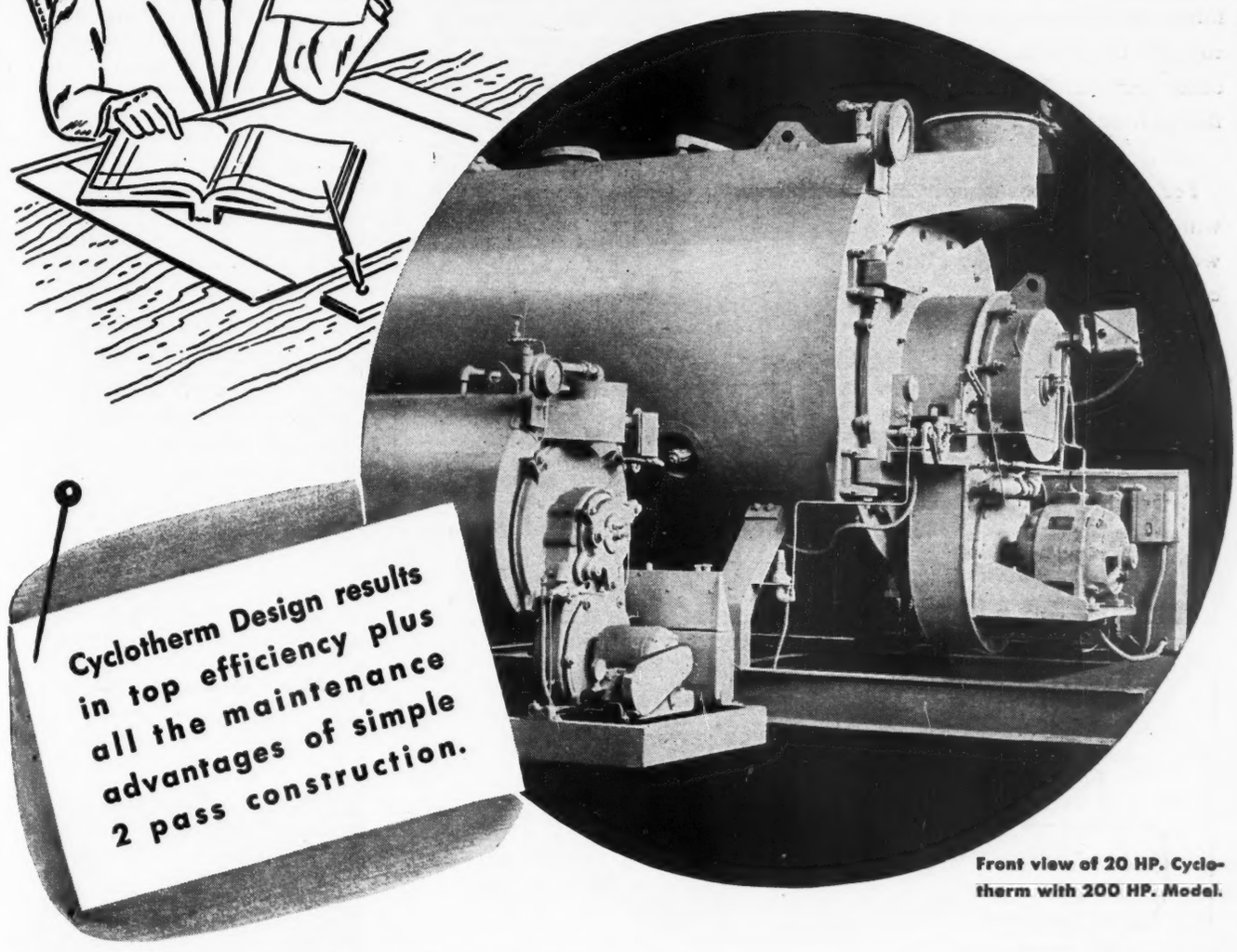
THE National Restaurant Association in cooperation with the Quartermaster Food and Container Institute is conducting a test on frozen chicken a la king. The test is being made at thirty day intervals, over a period of one year to determine what physical and chemical changes may occur in a precooked frozen product under various storage conditions as might be found commercially.

Data sought for aid in solving commercial production problems will include: Packaging material, packaging procedure, precooling limitations, freezing data, refrigeration requirements in shipping, effects of various storage conditions on flavor, color, texture, moisture, acidity, bacterial and mold contamination, of this type of product.

buy CYCLOTHERM

the steam generator that costs less to maintain





Front view of 20 HP. Cyclotherm with 200 HP. Model.

Cyclotherm's exclusive combustion method not only provides the highest efficiency of steam production and operation but also permits a greatly simplified over-all design including the use of 2 pass boiler construction. This combination of a more practical combustion principle and 2 pass boiler means longer fire tube life and fewer, easier inspections and clean-out jobs—*lower maintenance costs.*

Cyclotherm is manufactured in convenient sizes from 10 to 200 HP and with operating pressures from 15 to 200 psi. Units may be fired with any liquid or gaseous fuel and all operation is fully automatic. Heavy oil operation available in sizes 50 to 200 HP with automatic modulating controls. All sizes are also available with the Cyclotherm special combination burner arrangement to fire either oil or gas.

Initial cost and installation expense are low. Cyclotherm units are complete steam generating plants and are delivered to your door ready to operate on arrival.

Whatever your use of steam, there is a dependable Cyclotherm to do your job—and do it economically.

Wire, write or phone for more information

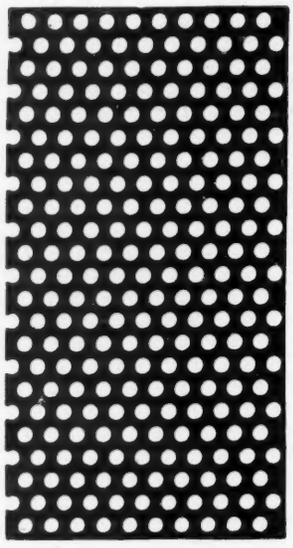
CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, BOX 401, NEW YORK 4, N. Y.

WHATEVER YOUR Process Screening Problems

Hendrick will furnish screens to meet your exact requirements for screening or sizing. Hendrick Perforated Metal Screens, of any desired shape and size of opening, are fabricated from stainless steel, aluminum, copper, bronze, brass, Monel, nickel, or other commercially rolled metals; flat, flanged, or curved to any diameter.

For special types of operations, screens with nozzle perforations, milled slots and wedge slots are also available. Write for complete information.



HENDRICK

Manufacturing Company

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids.

49 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

GLOBE WOVEN BELTS

ODORLESS!

TASTELESS!

WASHABLE!

Those are the "Big Three" of Globe Kanry-Tex!—Qualities of prime importance to belt users in food industries.

But there are other assets of Globe Kanry-Tex which have made it the choice of leading food processors everywhere. For instance, Kanry-Tex resists moisture, alkali, fats and oils. It's strong and durable. It's economical.

These are not just statements—Globe Kanry-Tex has *proved* its ability to give more efficient service over a longer period of time.

We invite your inquiries—or your mill supply house will be glad to give you the dollars-and-cents facts.

GLOBE WOVEN BELTING CO.

1403 CLINTON STREET,
BUFFALO 6, N. Y.

Triple Production Of Tangerine Juice

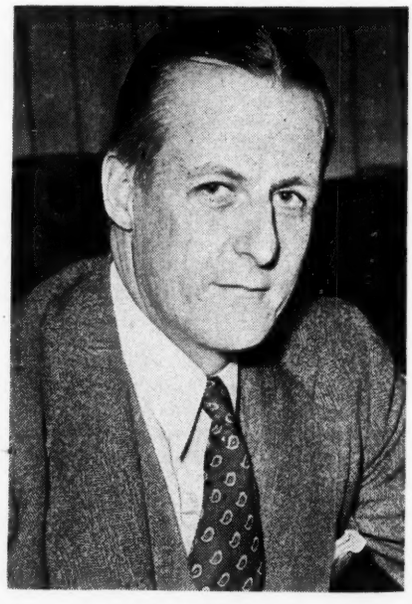
PROCESSORS of tangerine juice are expected to utilize 1,500,000 boxes of the Florida fruit during the 1946-47 season, according to estimates of the Federal Citrus Marketing Agreement Committees at a meeting in Lakeland. Last year the development of a commercially successful method of canning the juice resulted in use of 500,000 boxes.

Commercial production of Florida tangerines in 1946-47 promises to exceed any previous season, the marketing report stated. Previously only the better grades were harvested, leaving in many instances more than 40 per cent of the yield on trees. It is expected that with processing of juice a greater percentage of the yield will be utilized.

RFC Signs Contract For Bolivian Tin

THE Reconstruction Finance Corp. announced last month, that a contract has been signed with the Bolivian tin producers for the purchase by the corporation, during the year 1946, of Bolivian tin ores and concentrates.

The base price will be 62½ cents a pound of payable tin delivered f.o.b. vessel at the ports of Antofagasta or Africa, Chile, or Mollendo, Peru. The contract provides for a maximum production bonus ranging from one to three cents per pound



RESIGNS

Robert H. Shields, administrator of the Production and Marketing Administration and president of the Commodity Credit Corp., has resigned from both offices to enter business.

"WINNERS

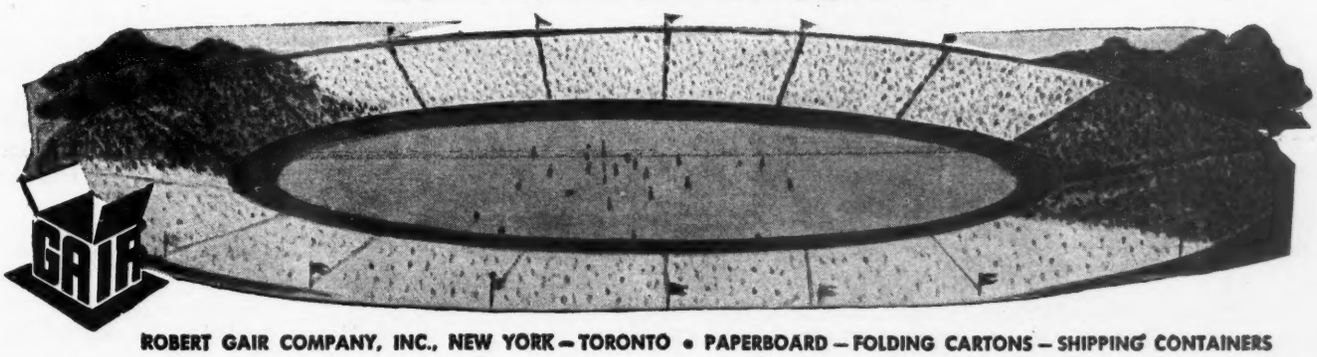
invariably have speed . . . precision . . . and skill" . . . says Robert Gair

High speed packaging machinery must have the uniform precision of a "tailor made" carton . . . folding cartons that embody the technical skill and "know-how" so consistently displayed by ROBERT GAIR over a period of more than eighty years.

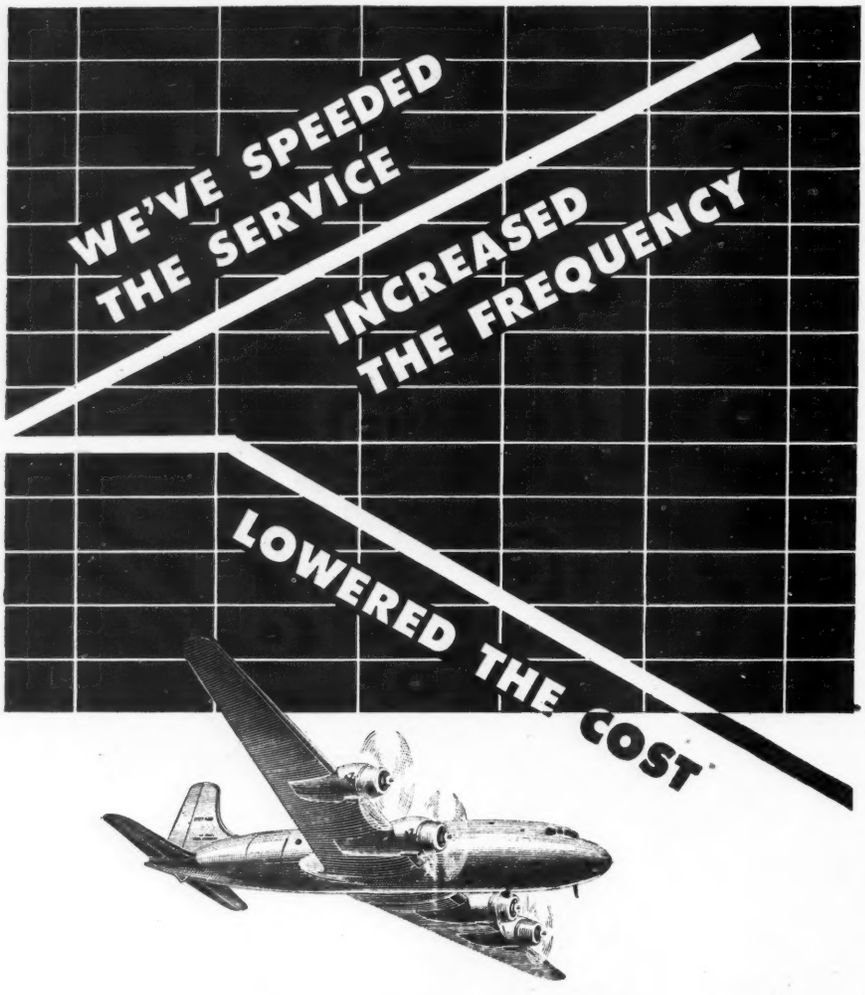
GAIRanteed cartons are consistently WINNERS in fields of keenest competition.

28 PHOTOGRAPHS OF POST-WAR AUTOMATIC PACKAGING MACHINES

Write for 22-page descriptive brochure, featuring 28 photographs of POST-WAR automatic packaging machines.



ROBERT GAIR COMPANY, INC., NEW YORK — TORONTO • PAPERBOARD — FOLDING CARTONS — SHIPPING CONTAINERS



Plenty of room now for your Air Express shipments!

More and Bigger Planes in the service of the Airlines mean even faster delivery for your Air Express shipments. Speeds up to five miles a minute now make overnight coast-to-coast deliveries routine.

Greatly Lowered Costs! Today Air Express is a better value than ever. Included in the cost is special pick-up and delivery in all major U. S. towns and cities. Same-day delivery between many destinations. Rapid air-rail schedules to 23,000 off-airline communities.

Air Service Abroad to and from scores of foreign countries and the U. S. It's the world's best service, in the world's best planes.

RATES CUT 22% SINCE 1943 (U. S. A.)					
AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07¢
349	1.02	1.18	2.30	3.68	9.21¢
549	1.07	1.42	3.84	6.14	15.35¢
1049	1.17	1.98	7.68	12.28	30.70¢
2349	1.45	3.53	17.65	28.24	70.61¢
Over 2350	1.47	3.68	18.42	29.47	73.68¢
INTERNATIONAL RATES ALSO REDUCED					

Write Today for the Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17, N. Y. Or ask for it at any Airline or Railway Express Office.

AIR EXPRESS

GETS THERE FIRST

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the AIRLINES of the United States

of payable tin together with certain adjustments with respect to smelter charges and unit deductions.

The material will be transported to the Texas City Smelter where tin ores and concentrates are refined for RFC.

RAW MATERIALS

Domestic Fat Supply Brighter Next Year

FATS and oils as a whole will continue to be short next year, but a moderately large domestic production of food fats as a group—lard, butter, margarine, shortening, cooking and salad oils—has been forecast by the Bureau of Agricultural Economics for the 1946—47 year. Although lard production probably will be off about 100,000,000 lb., the loss will be more than offset by lower exports, particularly lard, and an increase in butter production, according to government estimates. Little difference is expected in the production of edible beef fat and vegetable oils from the 1945-46 quantities. Imports of edible fats are not expected to have any more effect on the supply situation next year than was experienced this year when there was little movement recorded.

Total production of fats and oils —both edible and inedible—in the U. S. is expected to be slightly less, in the year beginning October 1, by government officials who forecast an output of 8,000,000,000 lb., approximately 3 percent below the year before.

Large supplies of animal feeds are the basis for the expectation of a slight increase in butter production. Feed will be available for a larger yield of lard per hog than occurred during the year just closed, which will partially compensate for the decline in hog numbers that will be sent to market during the next 12 months.

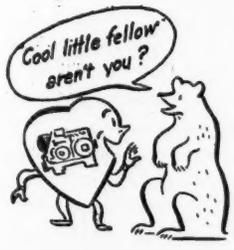
Indications are for little change in production of edible vegetable oils. Soybean oils production will be slightly lower while cottonseed oil and corn oil will show a slight increase. More peanuts may be crushed for oil during the 1946-47 year than in the previous season. Production of linseed oil will be materially smaller.

Imports of fats and oils are expected to increase, during the 1946-47 year, but only part of this will show up in larger supplies for domestic consumption because of the

"Darling, I am growing colder"

MR. BEVERAGE: Why do beverage coolers always give us such a chilly reception when you're around, Mr. G. E.?

MR. G. E. CONDENSING UNIT: That's easy, Bev. I'm the heart of the refrigeration system. And a cold-hearted system it is, if I may be permitted to brag a bit.



MISS ICE CREAM: Listen, tall, dark and icy, when it comes to ice cream cabinets, I notice you always keep cool in an emergency. How come?

MR. G. E. Oh, my G-E dealer sees to that. He's johnny-on-the-spot when the boss phones. Why he even takes care of units of other makes until more G. E.'s are available.

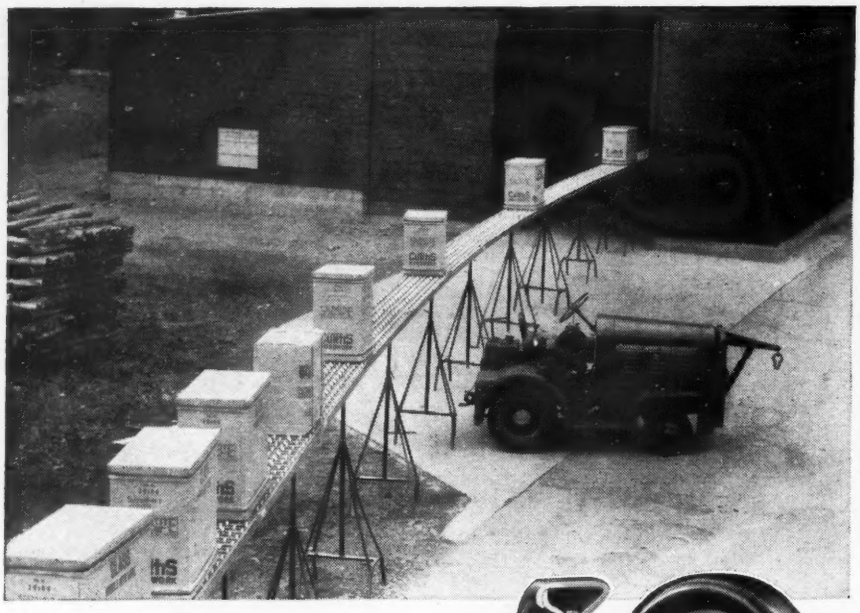
MR. BEEF: Other makes, indeed! Wish they'd stop cramping my locker plant with those big old-fashioned condensing units. You G. E.'s give a fellow more room to move around in.

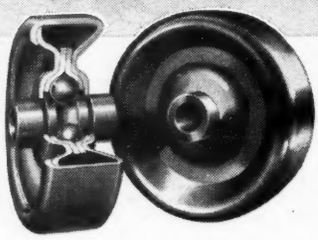
MR. G. E.: Don't blame you for beefing, old boy. But cheer up, my G-E dealer is helping your boss plan for expansion when the time comes.

MR. BEVERAGE: G-E units have a reputation as leaders in the refrigeration field. How about leading us in another song.

General Electric Company, Air Conditioning Dept., Section 8911, Bloomfield, New Jersey

GENERAL ELECTRIC





WHEELS DESIGNED FOR SUPERIOR PERFORMANCE

Exclusive wheel design, specially engineered for Rapid-Wheel gravity conveyors, guarantees longer operating life . . . offers a superior performance under many severe conditions.

Tests prove that the Rapids-Standard No. 11 recessed-hub conveyor wheels that are grease-packed on assembly are less vulnerable to corrosion, are longer-lived . . . give more efficient service. These tests compared the special Rapids-Standard grease-packed wheels with ordinary wheels that had no lubrication.

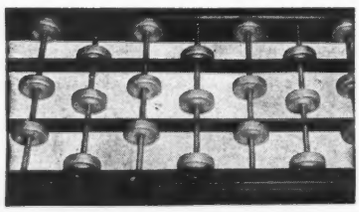
Both wheels were placed in a testing machine and were run intermittently for sixty-one hours; sixteen hours in operation, idle for eight hours. The wheels were sprayed with salt solution before and after each operation. After the test both wheels were cut open and examined. The ordinary greaseless wheels were seriously corroded while the special, lubricated wheels functioned normally . . . both the interior and exterior were in excellent condition.

Further life-tests with over-load on the wheels show the grease-packed wheel has 2½ times longer operating life.

All Rapid-Wheel portable, gravity conveyors are equipped with these special wheels. This, plus their many other features, give you efficient, economical service . . . helps you cut costly man-handling operations . . . increases production.

Check the facts. Send for a free Bulletin today!

A MODEL FOR EVERY NEED



RAPID-WHEEL CONVEYOR SPECIFICATIONS

Model No.	Width	Wheels per foot	Rated Capacity (Lbs. per 10 foot section)	Weight per foot
12-RS-12	12"	12	600	7.8
12-RS-10	12"	10	550	7.5
12-RS-8	12"	8	500	7.1
12-RS-6	12"	6	450	6.7
18-RS-18	18"	18	750	9.8
18-RS-16	18"	16	700	9.4
18-RS-14	18"	14	650	9.0
18-RS-12	18"	12	600	8.6

OFFICES IN PRINCIPAL CITIES

Manufacturers of

STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

The Rapids-Standard Co., Inc.

Sales Division—361 Peoples National Bank Bldg., Grand Rapids 2, Michigan

(Wide World)

COWS DO FLY

A great many GI's, remembering trans-ocean flights in cargo planes, will envy these three pure bred calves, donated to Greece by Borden's. They were flown to the Greek capital tended by Gus Kaloss, an American of Greek extraction, who saw to it that feed and bedding were served de luxe. The calves, of course, are to be used to rebuild Greece's depleted stocks.

reduced production of inedible oils in this country. Stocks carried over into the new year are between 20 and 25 percent below last year at this time. A possible increase in the per capita consumption to 62 lb. for food and industrial use is the net result. This compares with the 1935-39 per capita average of 67 lb.

The world supply picture as seen through the eyes of the Bureau of Foreign Agricultural Relations is for a lag of three years or more before world output of fats and oils returns to the 1935-39 level. This year world import requirements were approximately double world export supplies.

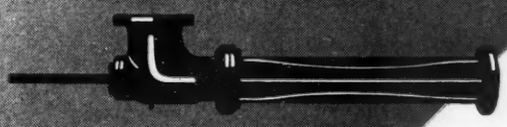
Last Quarter Exports Scheduled for Grain

THE U. S. Department of Agriculture has scheduled 2,270,000 long tons of grain and grain products for export during the fourth quarter of 1946. This is in addition to approximately 900,000 tons carried over from the third quarter, principally on account of shipments interrupted by the maritime strike. The quantity programmed for the third quarter was 3,200,000 tons, of which approximately 2,300,000 tons were exported.

The 2,270,000 tons programmed for the fourth quarter includes 1,045,000 tons of wheat, 858,000 tons of flour (in terms of wheat equivalent), 253,500 tons of corn, 62,500 tons of oats, 51,000 tons of grain sorghums.

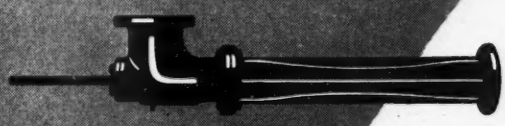
Wheat programmed for the

Steam-Jets FOR VACUUM SERVICE



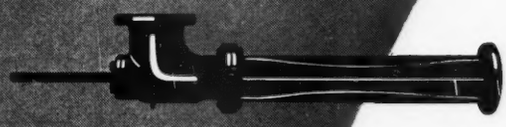
ANY VACUUM

Steam-Jet Ejectors can produce any pressure down to 100 microns (.004") Hg. Absolute. Ejectors termed "Thermal Compressors" are available for boosting steam through a moderate range of compression above atmosphere.



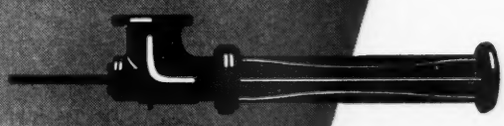
ANY CAPACITY

Ingersoll-Rand has an unlimited range of standardized sizes and types of ejector elements which can be combined to economically meet any capacity requirement.



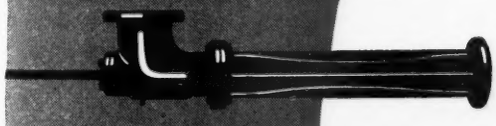
SUSTAINED EFFICIENCY

The Steam-Jet Ejector is a machine without moving parts. There is nothing to wear out or require lubrication. Efficiencies are maintained for long periods.



LOW MAINTENANCE

Strong sturdy construction, simplicity of design, and choice of correct materials mean long life and low maintenance for every I-R Steam-Jet Ejector.



BROAD APPLICATION

Wherever vacuum is used in a manufacturing process, there is an application for Steam-Jet Ejectors. An examination of the vacuum services in your plant may reveal an application for Steam-Jet Ejectors that will result in product improvement and reduced processing costs.

SEVENTY-FIFTH IR ANNIVERSARY

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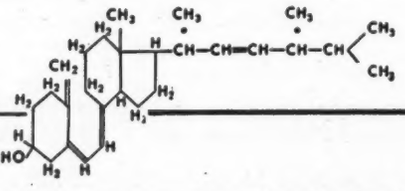
Calciferol

(PURE CRYSTALLINE VITAMIN D_2)

Calciferol is the name applicable *only to the superior, pure crystalline product* as so recognized and used throughout the world.



WRITE FOR DETAILS AND NEW LOW PRICE SCHEDULE

Winthrop's pure crystalline synthetic vitamin D_2 (Calciferol) is free from lumisterol, toxisterol, suprasterol, and other by-products of irradiation. It never varies in antirachitic potency.

OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
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- **NIACINAMIDE**
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- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **AMINO-ACIDS**

Valine	Glutamic Acid
Cystine	Tryptophane
Tyrosine	Phenylalanine
Leucine	Methionine

- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

POTENCIES AND PACKINGS:

Crystalline Form in vials of one, five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units	2,500 Standard Units
1,000 Standard Units	50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

250 Standard Units	1,000 Standard Units
500 Standard Units	20,000 Standard Units

*Standard Unit=1,000,000 U.S.P. Units

WINTHROP

For prices and information address
Special Markets Division
WINTHROP CHEMICAL COMPANY, INC.
170 Varick Street, New York 13, N. Y.

fourth quarter with the exception of a quantity for Mexico will be supplied by the Production and Marketing Administration. Flour, corn, oats and grain sorghums with the exception of quantities for UNRRA and U. S. Occupied Zones in Germany, Italy, Japan, and Korea will be procured by claimants through commercial channels.

Completion of the third and fourth quarter programs will represent approximately 55 percent of the 400,000,000 bu. of grain and grain products set as the goal for export during the current marketing year—July 1, 1946 through June 30, 1947.

Farm Income Decline Forecast by USDA

THE outlook for farm income, especially for net income, is not good according to the official forecasts of the Department of Agriculture, which are summarized officially as follows:

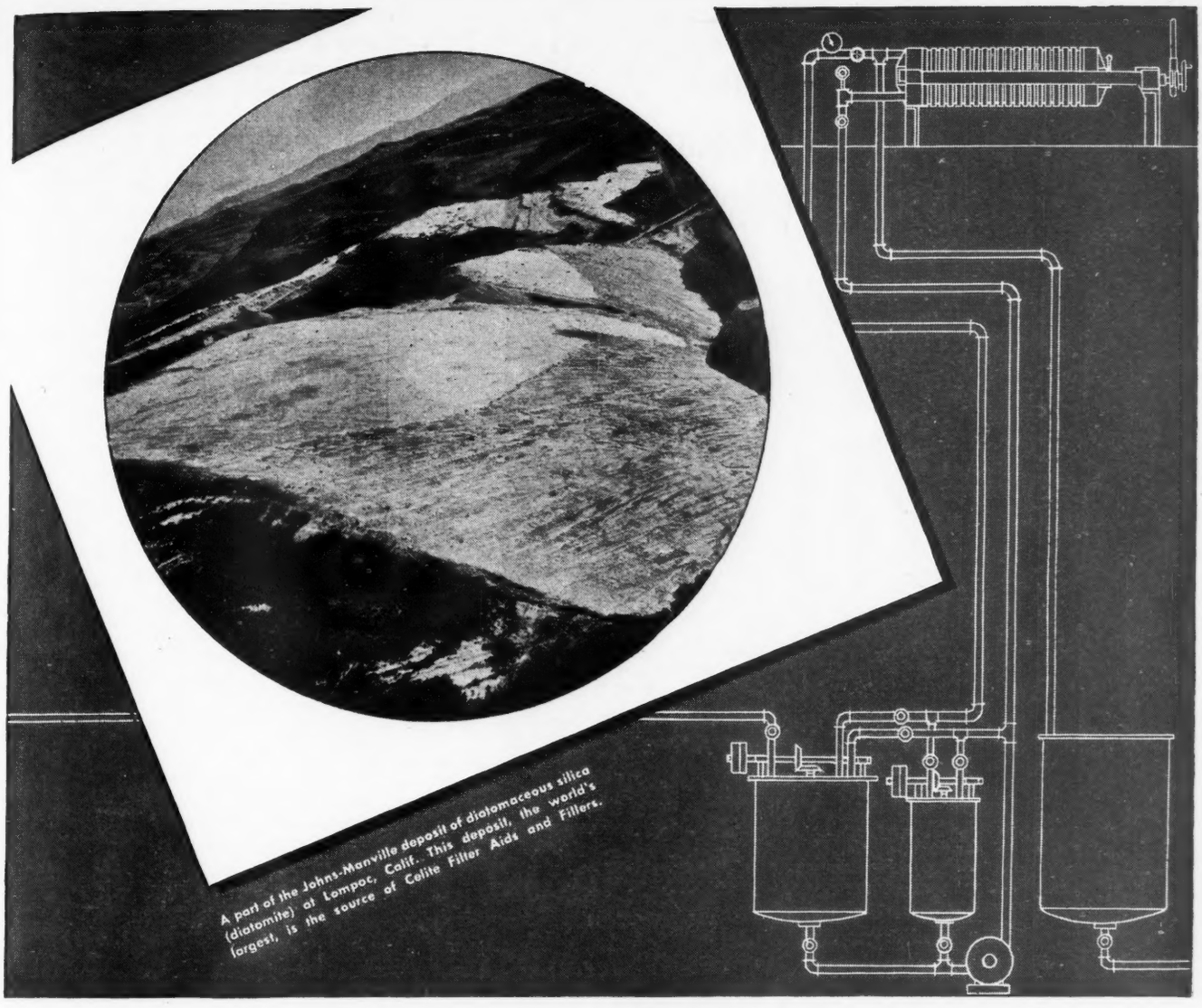
"Farm income is expected to remain at a high level in 1947 but below that of 1946. Cash receipts, gross farm income, production expenses, and farmers' net income in 1946 are all expected to total about 10 percent above 1945, and higher than in any previous year. In 1947, on the other hand, both cash receipts and gross income may decline by about 5 percent. With farm production costs expected to show a further rise in 1947, the net income realized by farm operators may decline by 10 or 15 percent."

Russia Plans Wheat In Coldest Territory

GRAIN cultivation is to be moved another two degrees according to Russian press reports, and within the next five years wheat will be grown in the area of Verkhoyansk, Yakutia, at 67 deg. N. lat. and 134 deg. E. long. Verkhoyansk, incidentally, is the coldest spot on earth, with the winter temperature dropping as low as 74 deg. C. This will be part of the five-year program of agricultural development in the Arctic.

Preparations are being made to launch cultivation in more northerly districts. The personnel of the agricultural experimental station in Bulun located at 71 deg. N. lat. has reportedly wrested another strip of land from the frozen north by growing cabbage, carrots, beets and other vegetables.

The development of agriculture in the Far North was launched in



A part of the Johns-Manville deposit of diatomaceous silica (diatomite) at Lompoc, Calif. This deposit, the world's largest, is the source of Celite Filter Aids and Fillers.

The NEWEST Filtering Techniques use one of nature's OLDEST materials

Plants which were alive from 2 to 5 million years ago are the basis of the most modern filtration processes in industry!

These plants later formed deposits of diatomaceous silica, the raw material from which Celite* is produced. A cubic inch of Celite contains over 35,000,000 diatoms, greatly varied in shape and size. They interlace to form a fine filter coating, with openings finer than the finest filter cloth. Teamed up with modern filtering equipment, this coating traps out suspended impurities, allows only clear liquid to flow through.

Johns-Manville produces 9 Celite Filter Aids of varying degrees of fineness to provide every desired combination of clarity and flow in the filtering of sugars, syrups, fruit juices, fats and oils, vitamins, drugs, lubricants, and many other liquids. Write Johns-Manville, Box 290, New York 16, N. Y., for further information.

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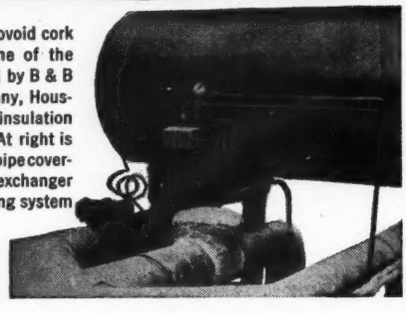
Reg. U.S. Pat. Off.

Johns-Manville *Celite* **Filter Aids and Fillers**

All over America
leading Insulation Contractors
install NOVOID

Shown above are some of the Novoid cork pipe fitting covers stored in one of the several warehouses maintained by B & B Engineering and Supply Company, Houston, Texas, one of the foremost insulation contractors of the Southwest. At right is shown Novoid cork lagging and pipe covering installed by this firm on the exchanger and piping of an air-conditioning system in Beaumont, Texas.



YOUR ORDER for delivery of Novoid Cork Pipe Covering can now be filled promptly. Contractors throughout the country can furnish a wide variety of sizes and thicknesses of Novoid, ready for immediate installation.

Novoid Covering is the moulded rigid insulation that efficiently reduces your cost of refrigeration. It snugly hugs pipes and fittings of every size and shape, does not sag, does not absorb moisture or odors, and is long-lasting.

For complete facts about Novoid Corkboard, Pipe Covering, and sundries specially developed to make low-temperature insulations most efficient, write to Cork Import Corporation, 39 Park Place, Englewood, New Jersey.

NOVOID INSULATION

CORKBOARD · PIPE COVERING

1926 and 1927. The total cultivated area in the Far North today is 350,000 hectares (a hectare is 2.47 acres). Under the current five-year plan the entire Kamchatka area, as well as the northern parts of the Krasnoyarsk and Tomsk areas (Eastern Siberia), will by 1950 be growing enough potatoes and vegetables, and almost enough grain as well, to meet their own requirements.

In addition to the extension of cultivated area by 20 percent on the average, the next five years will see a fundamental change in the entire system of agriculture in the North. Chief among the projected measures is the introduction of proper crop rotation in all districts.

State Quotas Uniform For Fats and Oils

BECAUSE of a fairly uniform distribution of fats and oils throughout the country the national quota for the use of fats and oils in the production of shortening, cooking, and salad oils will be made uniform for the fourth quarter of 1946, the Department of Agriculture announced last month. The quota for these products for the fourth quarter will be 88 percent compared with 82 percent plus a 6 percent reserve for deficit areas during the third quarter of 1946. The base period for these edible fats and oils is the average usage in the corresponding quarters of 1940 and 1941.

The quota for margarine will remain unchanged at 95 percent. The

(Press Association)

CITRUS HARVEST

Escaping the early October hurricane, with a loss estimated at less than 2 percent, the Florida citrus harvest got off to what promises to be its biggest year. Early estimates indicate a canned citrus pack of 70,000,000 cases, which would surpass last year's total by more than 8,000,000 cases.

To avoid damage from Oxidation . . .

protect with NITROGEN

LINDE Nitrogen provides an ideal means of protection against oxidation and corrosion by air. For packaging dehydrated foods; for deaerating, processing, storing and packaging fats and oils of all kinds; or for providing an inert atmosphere, free of impurities, for the complete protection of practically any material susceptible to oxidation, use LINDE Nitrogen.

LINDE Nitrogen is 99.7% pure, but is also available bone dry and at higher purity for special applications. It is supplied as a compressed gas in cylinders containing 224 cu. ft. each, or in bulk in tank-truck and tank-car lots as a liquid which is converted into gaseous nitrogen as required. LINDE Nitrogen in bulk offers remarkable savings in cost and eliminates cylinder handling.

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Good showmanship and functional design . . . out of materials that maintain full flavor and full protection . . . are demanded in this modern world, bred to packaged food perfection. Paksure designs wrappings, bags envelopes and boxes in cardboard, glassine, cellophane, pliofilm, laminated papers, etc. Let us solve your packaging problems. Write today for complete information.

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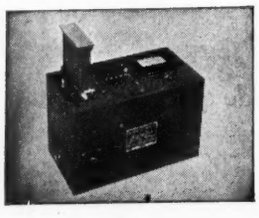
ONLY 1 MINUTE
To Make a Test!
with a
Steinlite



When used by an experienced operator it is "the one minute moisture tester." It is easy for anyone to become an experienced operator for no special education or training is necessary. About all one does is (1) weigh out a sample, (2) pour it into the Steinlite hopper, (3) read a meter dial, and (4) compare the reading with a chart showing percentage of moisture.

Steinlite tests wide variety of products—dehydrated foods . . . dried eggs, nuts, cocoa, etc. There are more Steinlites in use than all other electric moisture testers combined. Precision built by a firm of radio engineers and calibrated against official oven methods. Sold on free trial basis. No money down. Write for circular.

634 BROOKS BUILDING CHICAGO 6, ILLINOIS

SEEDBURO
EQUIPMENT COMPANY

base period for margarine is the corresponding quarter in 1944.

Due to a critical shortage of lard and fatbacks in 25 western and southern states, the department during the third quarter reduced the national edible fats and oils quota from 88 to 82 percent and provided, in addition, an emergency quota of 6 percent to relieve the extreme fats and oils shortage in these states. This action channeled about 30,000,000 lb. of fats and oils into these states. A recent field survey shows an improved supply situation in the western and southern states, making it possible to discontinue emergency measures and return to the former nationwide quota.

The action on quotas for the fourth quarter is contained in Amendment 28 to War Food Order 42, effective October 1.

Pepper Supply

ONLY one-half of one percent of the 20,000,000 prewar pepper trees on Bangka Island are still standing and only about 20 percent remain of those in Southern Borneo.

Netherlands Indies experts estimate it will take three to four years to rehabilitate pepper culture in the Moluccas, which was completely sacrificed to food production under the Japanese, cannot be restored to prewar levels in less than eight years.

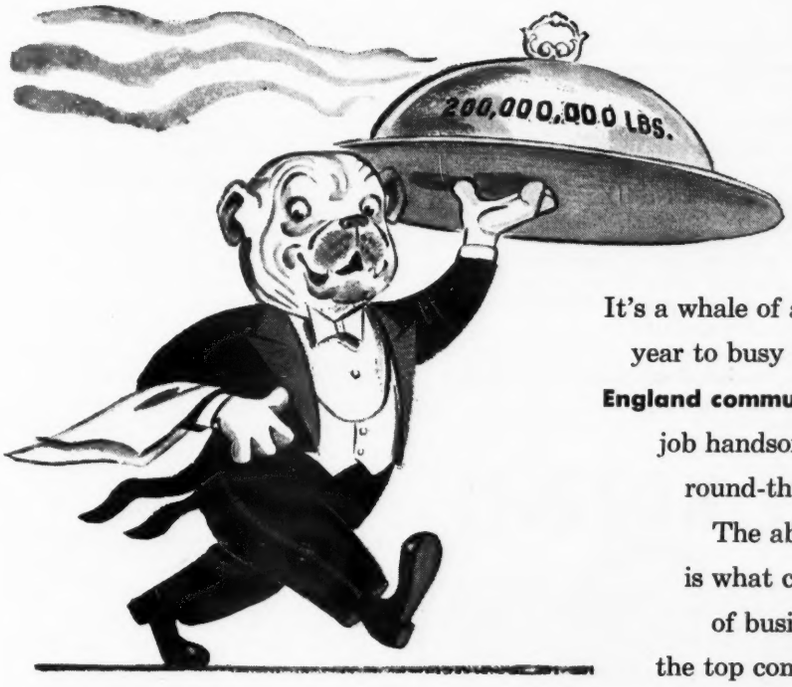
Mustard Crop

THE 1945-46 Indian rape and mustard crop will fall more than 200,000 tons short of the 1944-45 crop, according to a final survey completed recently by the Department of Commercial Intelligence and Statistics—910,000 tons as compared with 1,034,000 tons last year. Part of the decline is attributed to a decline in acreage to a total of 5,497,000 acres, but drought was the greatest factor. The condition of the remaining crop is described as fairly good.

Canned Milk

THE bulk sweetened condensed milk processors began operating, November 1, under a new sugar order based on the individual processor's average usage during the years 1943, 1944 and 1945. Allotments are designed to reduce wastage of surplus milk, and will not exceed the processor's average usage during the base period.

How to serve a 200 million-pound dinner . . .



It's a whale of a job toting 200,000,000 pounds of food a year to busy **Stop & Shop supermarkets in 75 New England communities.** Twenty-eight Macks are doing the job handsomely—covering a million miles a year on a round-the-clock rain-or-shine schedule.

The ability to *get there* . . . fast and always . . . is what counts in food deliveries or any other kind of business. That's why Macks are top choice of the top companies. Macks work harder, live longer, save you money in the end. Ask your local Mack man. He'll give you *facts* to prove it.

Mack
TRUCKS
FOR EVERY PURPOSE

Performance Counts!

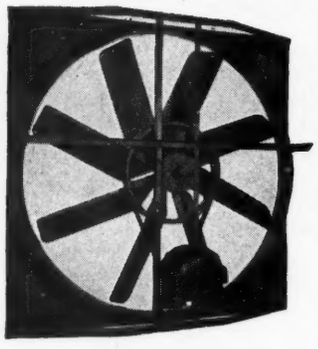
Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts.

HEALTHFUL WORKING CONDITIONS

WITH

Coolair
TRADE MARK

EXHAUST FANS



Profits are mighty hard to come by these days. One of the surest, most economical steps you can take toward a better profit position is to increase the efficiency and output of your present workers by providing better ventilation.

A COOLAIR fan installation may be just what is needed to revitalize your personnel . . . and *your profits*. Models similar to the illustration range in size from 16 inches to nine feet and are easily installed in window or wall openings, partitions, or on the roof . . . to exhaust heated air and fumes and to circulate fresh, cooling air.

Call in your Coolair Dealer or Agent for a survey . . . without obligation, or write for more information to . . .

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Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for new Bulletin N-616.

YARWAY SPRAY NOZZLES

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

Britain Buys

U. S. MANUFACTURERS will very soon begin to feel the effects of the $3,750,000,000 British loan, according to information gathered by the London office of the McGraw-Hill World News Bureau. Purchases are expected, by the British, to nearly double the 1938 rate, through 1948, reaching about $1,100,000,000. Foodstuffs will continue largest in volume, with the annual rate jumping from about $500,000,000 to $560,000,000. Purchases of canned fruit alone are likely to increase nearly $20,000,000 per year.

South Africa Canning

SOUTH African canners last year produced 141,000,000 tins of food, mainly fruit, according to the president of the Food Canners Council, A. Appleyard. He said the fears that the end of the war would see a decline in production were unfounded, but he advised canners to study the problems of educating urbanized natives to consume tinned foods, and suggested a reduction in prices for this market.

SCHEDULE OF EVENTS

November

13-15—University of Minnesota, Milling Sanitation Short Course, Green Hall Auditorium, University Farm, St. Paul, Minn.
17-20—Master Brewers Association, meeting, William Penn Hotel, Pittsburgh.
18-20—Grocery Manufacturers of America, 38th annual meeting, Waldorf-Astoria, New York.
19—Association of Pacific Fisheries, 33rd annual convention, Olympic Hotel, Seattle, Wash.
19-21—American Bottlers of Carbonated Beverages, 28th annual meeting, Miami, Fla.
20-22—Dairy Manufacturing Conference, North Carolina State College, Raleigh, N. C.
25-26—Packaging Institute, 8th annual convention, Stevens Hotel, Chicago.
25-26—American Butter Institute, 38th annual meeting, Morrison Hotel, Chicago.

December

4- 5—Tri-State Packers Association, fall meeting, Benjamin Franklin Hotel, Philadelphia.
10-11—Ohio Canners Association, annual meeting, Deshler-Wallick Hotel, Columbus, O.

January

12—National Food Brokers Association, Atlantic City, N. J.
19-24—National Canners Association, 33rd annual convention, Atlantic City, N. J.
19—Canning Machinery and Supplies Association, 40th meeting and exhibit, Auditorium, Atlantic City, N. J.
27-29—National Potato Chip Institute, conference and annual election, Netherlands Plaza Hotel, Cincinnati.
27-31—American Society of Heating and Centilating Engineers, 54th annual meeting and 7th International Exposition, Lakeside Hall, Cleveland, Ohio.
29-31—National Dairy Council, annual meeting and winter conference, Hotel Traymore, Atlantic City, N. J.

Changes in Food Supplies

(Indicators)

Production

Flour production decreased in September according to the *Northwestern Miller* whose estimate from approximately 71 percent of the industry indicates 15,059,010 sacks, a drop of 754,725 sacks from the previous month. This was also slightly under the September, 1945 output of 15,245,813 sacks.

Durum wheat manufacturers showed a September increase of 35,070 sacks over August, the output being 740,484 sacks. This production, however, is 141,535 sacks under September, 1945.

Creamery butter production showed a less than seasonal decline in August, when the estimated total reached 115,145,000 lb. This is a 10 percent July to August drop as compared with a 13 percent average drop in the five years 1940 to 1945. Production was 14 percent under August 1945.

American cheese production in August, estimated at 81,090,000 lbs., was 8 percent under July, which compares with a 13 percent decline last year and a five year average drop of 11 percent. Production, nevertheless, was 9 percent above the five year August average, being surpassed only in 1942 and 1945.

The Alaska salmon pack showed some improvement over the previous month's estimates, with the total reaching 3,871,499 cases on September 21. This compares with 4,298,701 cases on the comparable 1945 date and is close to the final figures for the 1946 pack.

Ice cream production reached 84,780,000 gal. in the August estimates, the highest production for the month ever recorded, but 14 percent below the July output. Production was 68 percent above August, 1945 and 70 percent larger than the 1940-44 August average.

Meat production for the first three weeks of September was down to 204,000,000 lb. which compares with 837,000,000 lb. in 1945 and 869,000,000 lb. for the same 1944 period. Production during August, on the other hand, came to 1,052,000,000 lb. compared with the 1945 output for the same period, of 1,012,000,000 lb. and a 1944 production of 1,179,000,000 lb.

Materials

The tomato crop, estimated at 3,093,900 tons is the second largest for processing on record. It will exceed the 1945 output by 15 percent and the recent ten-year average by 32 percent.

Corn production for processing will come within 3 percent of the 1942 harvest, reaching 1,253,400 tons as compared with 1,129,200 in 1945, and the ten-year average of 935,320. Total corn production was estimated, on September 1, to be 3,372,000,000 bu., 12 percent more than last year and 29 percent above the ten-year average.

Green peas for processing will exceed the 1945 output, totaling 522,610 tons, compared with 496,620 tons last year.

Green lima beans for processing are estimated at 42,910 tons, as against last year's harvest of 34,680.

Beets for canning are estimated at 141,200 tons, a sizable drop from the 186,600 tons actually grown last year.

Dry edible bean prospects were estimated at 14,741,000 bags (100 lb. uncleaned basis), which tops last year's output of 13,578,000 bags, but is close to 10 percent below the 1935-44 average of 16,400,000 bags.

Wheat was estimated at 1,167,000,000 bu., an all time high and 44,000,000 bu. above last year's crop.

Rye, on the other hand, dropped to an estimate of 21,400,000 bu., about half the average.

Indexes

The commodity price index on food, compiled by the *New York Journal of Commerce*, came to 138.9 for the week ending October 11. This compared with 138.6 for the previous week, and 108.6 for October, 1945.

Business Week's index of business activity stood at 183.0 for the week ended October 5. It was 183.1 the week before, 182.9 a month ago and 162.6 a year ago. The 1941 average was 162.2.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded Sept. (thousands)	Total Awarded 1946 (thousands)
Bakery	$ 2,925	$	$ 4,513*
Beverages	515	230	23,418
Canning and Preserving	6,555	....	5,913
Cold Storage	750	113	7,932
Confectionery	....	....	2,380
Grain Mill Products	78	1,095	13,809
Ice, Manufactured	....	55	1,115
Meats and Meat Products	755	358	2,825
Milk Products	965	1,400	13,574
Miscellaneous	690	1,375	22,016
	$13,233	$4,626	$97,495

Vi-Co

NATURAL "B" COMPLEX YEAST VITAMIN PRODUCTS AND YEAST DERIVATIVES

Plasmolyzed Yeast Extracts for FOOD and AMINO ACID PREPARATIONS

Vi-Co Plasmolyzed Yeast Extracts are prepared by enzyme digestion of brewers' yeast to yield a B complex product rich in essential amino acids. Amino acids provide the necessary "building blocks" for healthier and stronger bodies.

These products possess a definite "meat-like" flavor useful in enriching soups, bouillon cubes, tomato juice and other packaged foods. Such enriched foods are also of value for their natural B complex and high amino acid composition.

Consult us about your vitamin or yeast problems. Our technical staff can best advise you how Vi-Co products can be used to enrich your own products.

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POSITIVE PROTECTION
against WATER, OIL, ACIDS,
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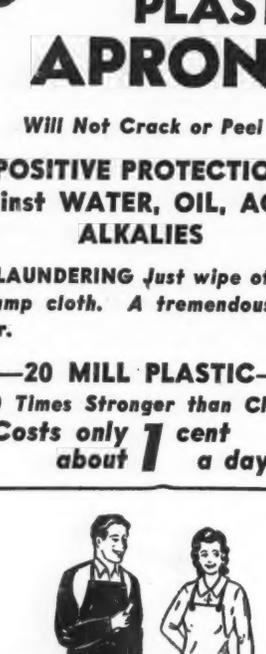
NO LAUNDERING Just wipe off with a damp cloth. A tremendous cost saver.

20 MILL PLASTIC
10 Times Stronger than Cloth
Costs only about 1 cent a day



PRICES—SIZES—COLORS

WHITE—4 Mill Plastic
27 x 36..$ 6.62 per doz.
30 x 36.. 7.53 per doz.
36 x 40.. 7.96 per doz.
36 x 44.. 8.85 per doz.
Full Length Sleeves $6.00 per doz. pair

BLACK or WHITE—6 Mill Plastic
30 x 36..$ 8.17 per doz.
30 x 36.. 8.87 per doz.
36 x 40.. 10.10 per doz.
36 x 44.. 12.38 per doz.
Full Length Sleeves $9.66 per doz. pair
Leggings Hip Length $11.90 per dozen pair

BLACK—12 Mill Plastic
27 x 36..$ 9.31 per doz.
30 x 36.. 10.15 per doz.
36 x 40.. 12.95 per doz.
36 x 44.. 14.35 per doz.

Maroon — Heavy Double Coated Neoprene
27 x 36..$12.90 per doz.
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WHITE — Extra Heavy 20 Mill Plastic
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Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

ALL PRICES F.O.B. Chicago.
Minimum order 1 dozen.

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

CPA TO STAY—Civilian Production Administration began its October work with the positive assurance, in writing from the White House, that none of its functions will be transferred to any other agency and that CPA will be kept intact even beyond December 31. This seems to mean that top decision has been reached to continue the control of many industrial commodities by priority and allocation well into next year. It is not evident how that continuance of Federal control can be escaped so long as Washington woos the veterans with unkeepable promises about housing and other rewards for service in uniform. And Washington officially knows, even when it will not admit the fact, that the continued recurrence of labor troubles is preventing progress toward a day of sufficient supplies for industrial construction. It looks as though food technologists must plan another year of makeshift on most of the building and remodelling plans already delayed several years by the war.

CONTAINER COSTS—Producers of a considerable number of commodities have been allowed to increase selling prices in order to take account of the increased cost of containers required for their products. For example, orange shippers were given a 12 cent increase in ceiling for their 75-lb. crates. This argument is one which is likely to be very effective in many cases as container costs continue to rise because of the increased materials prices.

SATURDAY WORK — Freight-car shortage is likely to continue for a year or more, especially if labor unrest is eliminated and full scale operation resume in many struck industries. There will be far greater demand for transportation than can be met by all usable equipment of the railroads. This means that demurrage rates will continue, and six-day loading and unloading programs are likely to be necessary for a long time to come. These problems are not easily met within the 40-hour work week unless entirely new sorts of working schedules are set up. In some cases, it may prove necessary to go a seven-day loading and unloading program in order to take advantage of prompt car movements and avoid the hold-up at the shipping and receiving department of vital goods inbound or outbound. This may even extend to the need for operation of certain parts of the plant, such as packing facilities, on more than a five-day one-shift basis. The best of technologic skill has got to be applied in order to stretch transportation facilities where they threaten to be a bottleneck.

RESEARCH SPENDING — Appropriations for research and development work, made by the last Congress, permit spending this fiscal year of several hundred million dollars for scientific and engineering investigations. If one includes the capital investment in new laboratories, which is being made, the total of government disbursements and commitments this year will approach $1,000,000,000. These facts serve to emphasize the change in attitude of politicians towards technical workers. It is now recognized as politically expedient to support research, whereas formerly science merely was tolerated. One may even guess that politicians are now more anxious to spend for investigations of a technologic sort than are the managements of some food comcreased amount of the new bases for panies. This may mean that an inimproved technology may come from government laboratories instead of from the laboratories of the companies themselves. As yet that is only a possibility, but one worthy of consideration by top executives.

STRIKES—Washington believes that a vast majority of leaders of organized labor do not want their unions to strike. But unfortunately the average labor leader thinks that he must get something for his union as big,

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preferably bigger, than other union leaders have gotten for their organizations. Thus a new kind of "keeping up with the Joneses" in union matters promises more strikes than Washington likes to contemplate.

ROLL-BACK FAILS — Restaurant prices were rolled back to their June 30 ceilings as soon as OPA resumed control, when reestablished by Congressional action. The constant rise in market prices, especially of meat, later compelled a breakdown of the roll-back principle. Washington does not expect that roll-backs will succeed anywhere fully. They are merely palliatives or brakes on the upward-spiral movement.

DIETARY CLAIMS—Resuming, on a postwar basis, its policing of merchandising practices, Federal Trade Commission has issued a number of complaints against food companies. One of the most critical complaints and orders attacked as "false and misleading" many of the dietary claims made for certain baked goods. Food industries generally must recognize that the Federal Trade Commission is again critically active in its review of any dubious merchandising practices. Wartime carelessness in claims is not likely longer to escape disciplinary review.

PRICES MISJUDGED—Parity price indexes dropped in September from the preceding month—the first downward movement in six years. Casual notice of this fact led some to believe that a turn in the prices paid by farmers for materials and services had come about. But the fact is that the September drop of several points came about largely because of the sudden upsurge in prices that occurred in July and August, when OPA ceilings were temporarily removed. The fall prices paid are actually, substantially above those of the spring or a year ago.

PROFIT PROSPECT — Washington, and probably Wall Street, is just as much confused as the rest of us as to why the stock market tumbled so abruptly during September. The only explanation, which seems generally accepted, merely restates the obvious fact when it says that the stock decline was caused by poor profit prospects. Unfortunately, Washington is not able, or does not care, to temper its administrative actions in such a manner as to make the prospect of puny profits from industry any less than before. One need not be surprised at this when he realizes that Washington has still essentially a labor government. The challenge to food technologists to keep ahead of rising costs by improved processing is one generally accepted, but hard to meet when new equipment for modernization and repair continues almost wholly unavailable.

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Ethavan will bring sales-building advantages to your product. Its flavor is more distinctive than that of vanillin. Its aroma is more pronounced, more pleasing. It has an individuality that "stays"—even when products are subjected to high or low temperatures in processing. It is more economical to use than vanillin because it is approximately three times stronger than vanillin.

Build increased sales around Ethavan! Use it to impart intriguing flavors, accent aromas or as a fixative in the formulation of vanilla flavorings. Experimental samples will be furnished on request. Contact the nearest Monsanto District Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, Saint Louis 4, Missouri . . . District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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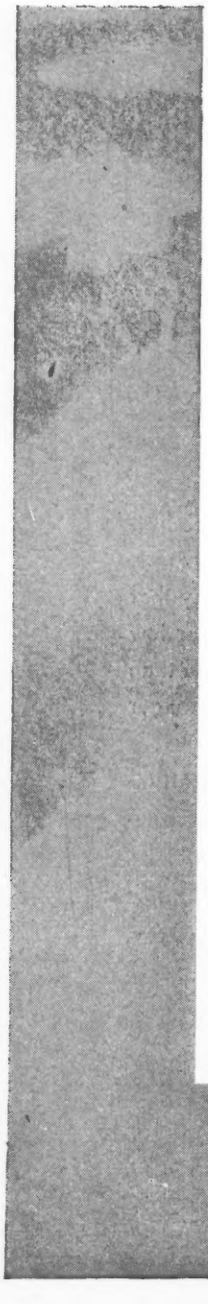
SERVING INDUSTRY...WHICH SERVES MANKIND

FOR THE PREVENTION OF BROWNING OF FROZEN FRUITS

ASCORBIC ACID-CITRIC ACID MIXTURE



As soon as a fruit is peeled or sliced, it is exposed to the action of atmospheric oxygen. The first result of this exposure is the oxidation of the ascorbic acid (Vitamin C) naturally present, and as soon as this has occurred certain substances also present are next attacked causing the development of a brown color. The rates at which these oxidations take place are also greatly increased by certain enzymes present in the fruit.

Since the ascorbic acid must first be oxidized before "browning" occurs, this latter can be postponed by adding additional quantities of the ascorbic acid and naturally the more that is added the longer "browning" is delayed, although with the enzymes present, to speed up the oxidation, it will eventually occur.

Experimental work carried out in the laboratories of Chas. Pfizer & Co., Inc., has demonstrated that by adding a small amount of citric acid to the fruit the enzymes, which cause rapid oxidation, are inactivated and only a relatively small amount of ascorbic acid need be added to protect cut or frozen fruits against "browning".

Chas. Pfizer & Co., Inc., now has available an ascorbic-citric acid mixture (4% ascorbic acid U.S.P., 96% citric acid anhydrous) which combines the enzyme-inactivating effect of the citric acid with the anti-oxidant effect of ascorbic acid to give better protection against the "browning" of frozen fruits *and at a lower cost.* For further information please inquire of Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 W. Grand Avenue, Chicago 10, Illinois; 605 Third Street, San Francisco 7, Calif.

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INDUSTRY

Froedtert Grain and Malting Co., Milwaukee, is constructing a third malting plant adjacent to its other building. The $3,000,000 project will have a storage capacity of 1,000,000 bushels of grain and will greatly add to the company's present malting capacity.

Goodlander Mills Co., Fort Scott, Kansas, was destroyed by fire in late August. Loss is estimated at $30,000.

Graham Dry Foods Co., Belleville, Ont., was damaged on September 17 when fire swept through the plant which was packing canned corn, tomatoes and peas, as well as a line of dehydrated foods. The amount of the loss is estimated at $250,000.

Griffith Laboratories, Chicago, expects its new Los Angeles plant to be in operation before November 1. The unit will supplement the present plants at Newark, N. J., Chicago and Ontario. Warehouse facilities for distribution of cereal products as well as manufacturing facilities for liquid and soluble seasonings, yeast foods and other items for the meat-packing and baking industries, will be provided.

National Cranberry Association is a new cooperative which will market 45 percent of the national crop produced by more than 800 grower members. Marcus L. Urann, president of Cranberry Canners, Inc., will serve as president of the Association, with headquarters in Hanson, Mass. John C. Makepeace is secretary-treasurer.

The National Vitamin Foundation, Inc., has announced the appointment of an advisory committee of eight scientists to assist Dr. Robert Stanley Goodhart, Scientific Director, in formulating an overall research program on vitamins, and to improve investigation through grants-in-aid to institutions continuing three such projects now under way. The foundation replaces the institute for vitamin research and has headquarters in New York. Dr. Theodore G. Klumpp, chairman of the board of governors, says the research program will be designed to permit the support of projects likely to furnish information needed to fill in serious gaps in our knowledge of nutrition. Members of the advisory committee are: Dr. Otto A. Bessey, the Public Health Research Institute of the City of New York, Inc.; Dr. George R. Cowgill, Yale University, School of Medicine; Dr. Norman Jolliffe, Nutrition Clinic of the Department of Health of New York City; Dr. H. D. Kruse, Milbank Memorial Fund; Dr. Carl V. Moore, Washington University, School of Medicine; Dr. Severo Ochoa, New York University, College of Medicine; Dr. W. A. Sebrell, the National Institute of Health, and Dr. Frederick F. Tisdall, University of Toronto.

Neuhoff, Inc., Salem, Va., has purchased the building, equipment and good will of Reynolds Packing Co., Union City, Tenn. Jeff Yarbrough, manager of the Union City plant, will continue in that capacity under the new arrangement.

The Pabst Brewing Co., has announced an expanded program of research under the direction of Dr. Alexander Frieden, who recently joined the organization. A research building is now under construction at Milwaukee. The unit will house offices, pilot plants, theoretical and applied laboratories.

Swift & Co., Chicago, has purchased land in Grand Rapids, Mich., for the immediate erection of a $750,000 ice-cream plant which will replace the present plants in Grand Rapids and Holland, Mich.

JAMES McGOWAN, JR.

Following the recent death of Arthur C. Dorrance, James McGowan, Jr., was elected to succeed him as president of Campbell Soup Co., Camden, N. J.

H. H. McKEE

Assistant general superintendent for Swift & Co. for many years, H. H. McKee has retired after a total of 46 years of service to the company.

THOMAS S. PATTERSON

E. ROLLAND McCONNELL

John H. Dulany and Son, Inc., Fruitland, Md., recently announced the appointments of E. Rolland McConnell as director of quality control and Thomas S. Patterson as chief engineer. Mr. McConnell formerly was a bacteriologist for H. J. Heinz Co., Pittsburgh. Mr. Patterson has been an engineering officer in the U. S. Navy.

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BARRELS AND DRUMS
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The solid head drum at the left and the patented Ringlox drum shown above are but two of the many styles in the complete Republic STEVENS Line.

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NILES, OHIO

Republic STEVENS
METAL BARRELS AND DRUMS

PERSONNEL

Norman Bauch, formerly director of sales and advertising for National Dairy Products Corporation, New York, has been elected executive vice-president and director of Allied Home Products Corp., Beloit, Wis. Mr. Bauch will supervise the advertising and sales program for the organization.

James F. Brownlee, formerly vice-president of General Foods Corp., has been elected to the Board of Directors of Pillsbury Mills, Inc., Minneapolis.

W. B. Crawley, Banks, Ala., has been re-elected president of the Georgia-Florida-Alabama Peanut Association. It is his ninth consecutive year as GFA president.

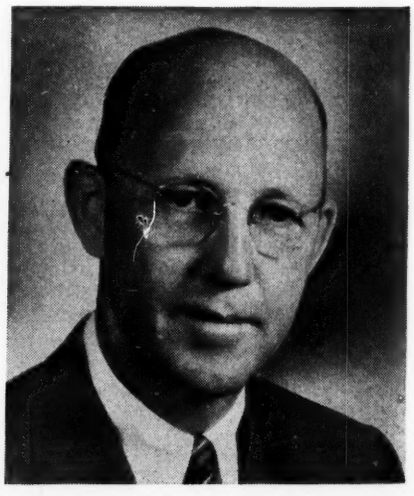
S. Taylor Creighton is the new general vice-president of Altes Brewing Co., Detroit. He formerly was vice-president and director of sales for Brewing Corporation of America, Cleveland.

E. L. Dosch, former director of research, International Milling Co., Minneapolis, has joined American Home Foods, N. Y.

Dr. Fred F. Flanders, Wellesley, Mass., has retired as chief chemist in charge of the State Purchasing Bureau Laboratory.

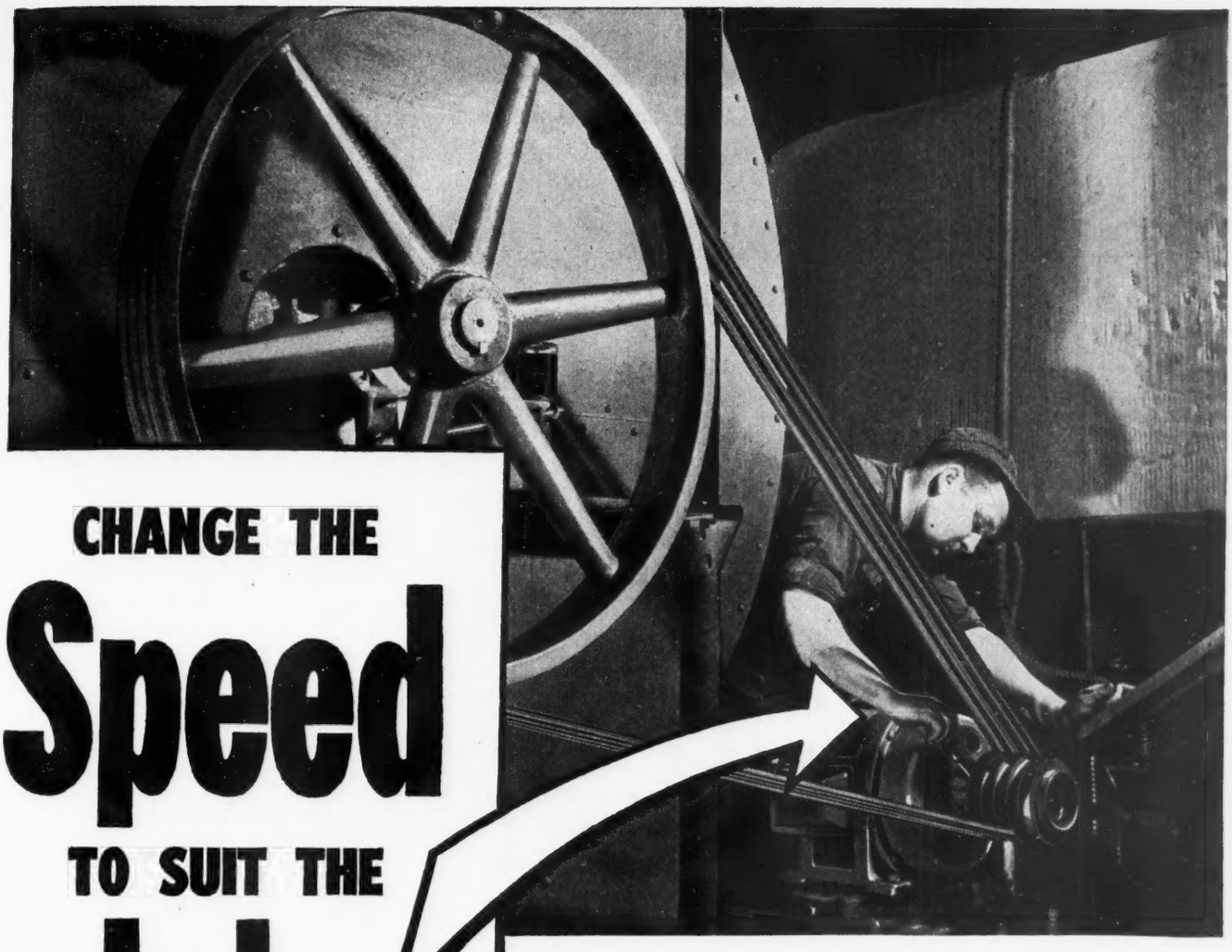
Kurtis R. Froedtert was re-elected president and chairman of the Board of Froedtert Grain and Malting Company, Inc., Milwaukee, at the annual meeting of the board of directors in September. James P. Hessburg is vice-president and Alvin R. Cord is vice-president and secretary-treasurer.

Oscar G. Mayer, president of Oscar Mayer & Co., Chicago, is making funds



WILLIAM U. HUDSON

Gerber Products Co. has appointed William U. Hudson head of all production for its baby food operations, according to Dan Gerber, president.



CHANGE THE Speed TO SUIT THE Job..

Texrope Vari-Pitch sheave makes it possible to vary the speed of this ventilating blower up to 25% to meet seasonal changes. Speed adjustment is quickly and easily made. A2102

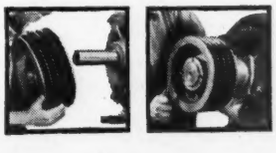
Economical...TEXROPE Variable Speed Drives!

Whenever variations in speed will add to efficiency, production or economy — use TEXROPE Variable speed drives with standard constant speed motors. A Vari-Pitch sheave may provide all the speed range needed. They're available for stationary or motion control. Wide-Range Vari-Pitch sheaves and V-Belts provide greater range up to 116% — Speed Changers up to 375%.

A Complete Line . . .

Sheaves, Speed Changers . . . V-Belts . . . Engineering Aid. Your nearest Allis-Chalmers office or dealer is headquarters for EVERY type of V-Belt Drive equipment. Save time by buying all your needs from one reliable source. Every item of equipment is designed and backed by Allis-Chalmers — originators of industry's Multiple V-Belt Drive. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

"Magic-Grip" Sheaves are Faster ON . . . Faster OFF



Here's the sheave that requires no filing, reaming or hammering to mount — no wheel-puller or bulging muscles to demount. *It comes completely assembled.* Just slide it on the shaft and tighten three cap screws. That's all! Grips like a vise — no shear, wobble or backlash. No damage to shaft or motor bearings.

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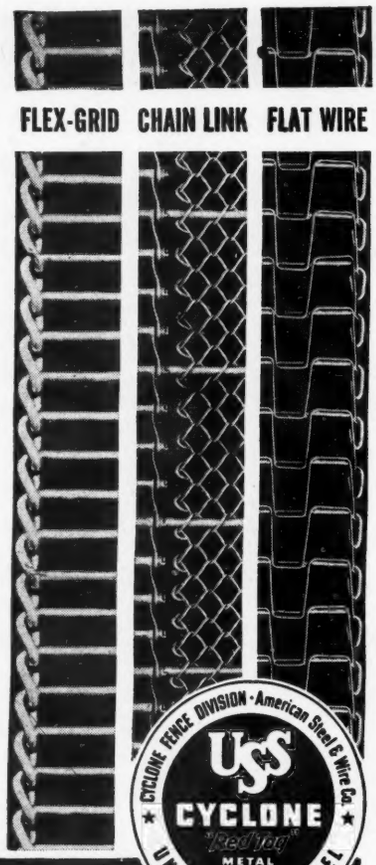
3 types of metal conveyor belt by CYCLONE



BECAUSE Cyclone makes three types in a wide variety of metals, alloys and finishes, you get unbiased recommendations when you consult us about metal conveyor belts. Such a wide choice in style and material assures you of a belt to do your particular job efficiently and economically. 25 years of experience have given our personnel a wealth of practical knowledge which is at your service when you consult us about your conveyor belt problem. Cyclone's enviable reputation for quality and dependability is your assurance of satisfaction.

When you are planning a new belt installation, call the Cyclone office nearest you. There is no obligation. Or write for free catalog No. 3. Offices located in principal cities . . . factories in the Midwest and on the Pacific Coast.

By the makers of Cyclone Fence

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United States Steel Export Company, New York

UNITED STATES STEEL

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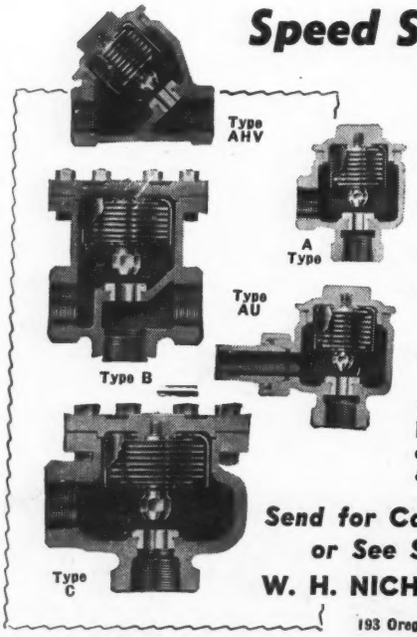

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2. NO AIR BINDING. Discharge air as efficiently as water.
3. NO FREEZE-UPS. Drain completely when cold.
4. NO DRIBBLING. Close when steam contacts bellows.
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6. NO WATER-LOGGING. Few degrees change opens valve.

Five types: size 1/4" to 2". Pressures to 225 lbs. Low cost.

FLOATS — Stainless, Monel or chromium-plated Steel; all sizes, pressures.

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available to the Institute of Meat Packing at the University of Chicago, for a study of the factors affecting consumer demand for meat. The Institute of Meat Packing is the educational branch of the American Meat Institute. The project will be conducted in cooperation with the Department of Agricultural Economics of the University of Illinois, and will be under the direction of Professor Elmer J. Working.

R. B. McLeaish, former manager of the Bayview Citrus Grove properties, and general manager of the Texsun Citrus Exchange, now is associated with Quality Products Co., vegetable and citrus canner of LaFeria, Tex.

Harrell H. Neel, president of Ewing-Von Allmen Dairy Co., Louisville, Ky., has been appointed assistant vice-president of National Dairy Products Corp., in charge of the Midwest zone, with headquarters in Chicago. Announcement was made by L. A. Van Bomel, president of National Dairy Products.

C. F. Niven, formerly research bacteriologist with Hiram Walker, Inc., Peoria, has joined the Chicago University research staff of the American Meat Institute.

B. L. Oser, Food Research Laboratories, New York, recently was elected chairman of the food and agricultural division of the American Chemical Society. Other officers are vice-chairman, Paul Logue, Monsanto Chemical Co., St. Louis; Secretary-Treasurer, L. E. Clifcorn, Continental Can Co., Chicago; Executive Committee, Carl Fellers, Massachusetts Agricultural College, Amherst; John S. Andrews, General Mills, Inc., Minneapolis; Ira D. Gerard, New Jersey College for Women, New Brunswick, N. J., and W. J. Peterson, North Carolina State College, Raleigh, N. C.

W. J. Shannon, formerly assistant professor in food chemistry, Iowa State College, is now head of the Oscar Mayer & Co. Research Dept., Madison, Wis.

Clifford D. Wayne, assistant manager of the Atlanta Div. of Southern Dairy since 1943, has been made manager. Frozen foods now account for one-fourth of the company's entire operations.

Frederick R. Weisman has been elected president of Hunt Foods, Inc., Los Angeles, succeeding M. E. Wangenheim, who has been named chairman of the corporation's executive committee.

Henry H. Young and Price Davis Wickersham, Jr., have joined the technical staff of the Midwest Research Institute, Kansas City, Mo. The Institute's personnel now numbers 93.

ALL PUMP AND MOTOR PARTS ARE
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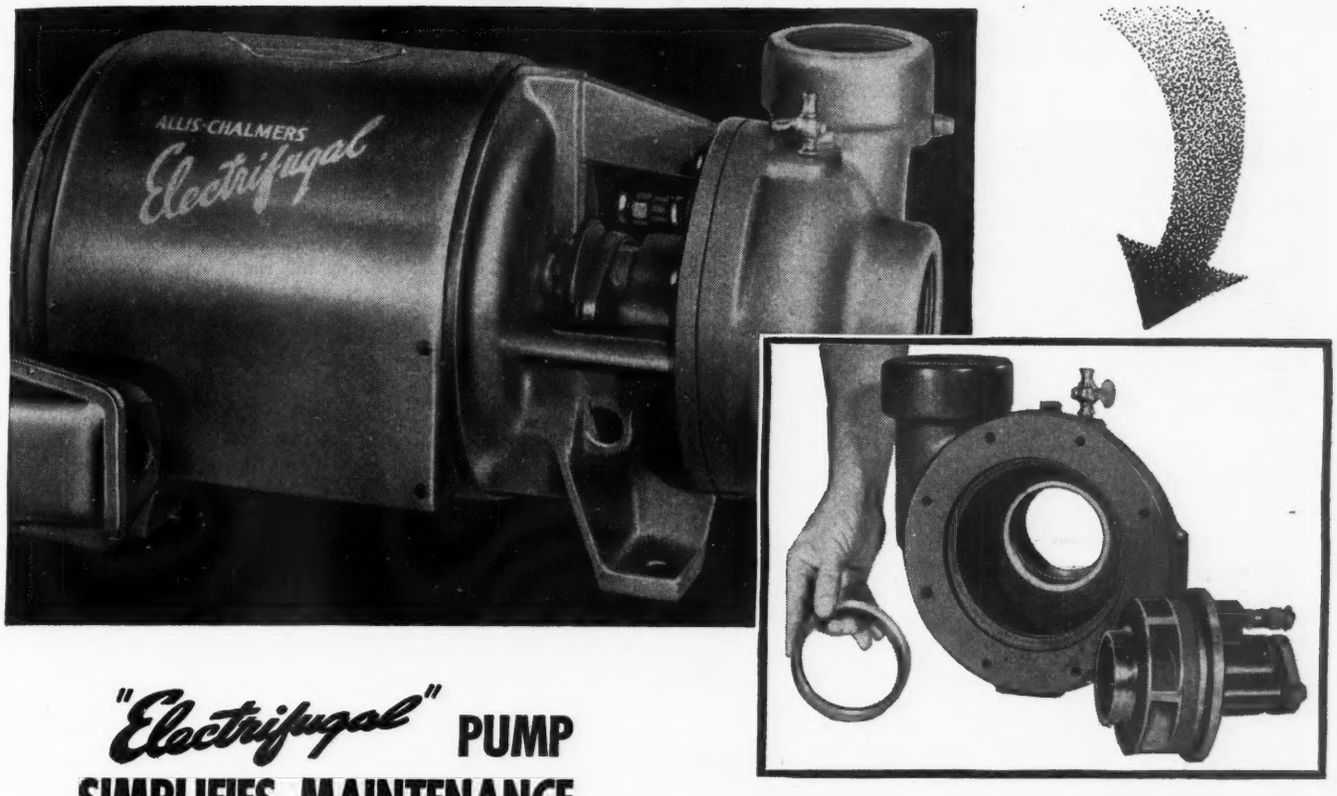

"Electrifugal" PUMP SIMPLIFIES MAINTENANCE

AS THIS photo suggests an "Electrifugal" pump is simple and sturdy in design. Moving parts are few and easy to get at. The pump can be taken apart readily, for inspection and replacement of packings or wearing rings, when necessary.

Compact, rigid design gives you an efficient, quickly installed "package" pump ideally suited to a wide range of applications . . . low in first cost and cost of operation.

COMPLETE LINE OF CENTRIFUGAL PUMPS

In addition to "Electrifugal" pumps in capacities for 15 gpm to 1600 gpm, heads to 500 feet, motor hp ratings from ¾ to 25 hp — Allis-Chalmers designs and builds a complete range of sizes and types of centrifugal pumps up to capacities of 170,00 gpm.

In Allis-Chalmers' broad line you can select from single and double suction, single and multi-stage, liquids and solid-handling types . . . offered with and without Allis-Chalmers motors. Ask for bulletin B6018. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A2072

Construction Features That Cut Pumping Cost:

ONE RIGID FRAME supports both pump and motor. Impellor and rotor are on the same shaft. No coupling and alignment troubles — vibration cut to a minimum.

LO-MAINTENANCE splash-proof motor, specially built for pumping service . . . in the same plant that makes the pump. That means undivided responsibility.

BRONZE WEARING RINGS protect casing from wear. New plastic water seal and five or more generous packings are additional long-life features that cut maintenance costs.

PROVED PERFORMANCE . . . every unit thoroughly tested at the factory; efficiency, capacity and head are carefully recorded and filed for reference. A 2072

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Electrifugal PUMPS

Mathews

GRAVITY ROLLER CONVEYERS

Engineered to serve Production

The 2½" diameter roller with sealed heads and 22SH Bearings resulted from considerable effort over many years toward developing a really sanitary dairy conveyer roller. It can be washed down with water or steam, and is designed for application under wet conditions. 4" channel frames are used with this roller, the rollers being held in place in the frames by lockbars. There is a Mathews Engineer operating in your vicinity. He will give you complete information about Sanitary Roller Conveyer for cases and cans, and will also tell you about the many other types of Mathews Conveyers which have been engineered to serve production.

MATHEWS CONVEYER COMPANY
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ENGINEERING OFFICES IN PRINCIPAL CITIES

DEATHS

Fred L. Dutton, 77, president of McCoy Canned Food Co., Urbana, Ohio, and vice-president of Winchester Canning Co., Canal Winchester, Ohio, September 8, in Columbus.

Frank Hockensmith, president of Bancker-Nichols Brokerage Co., Denver, and formerly associated with the Subsistence Branch, Army Quartermaster Corps, September 16, in Denver.

Charles E. Patrick, 51, superintendent of Swift & Co., Chicago, recently.

Richard Raleigh, 78, retired weightmaster for the Norris Grain Co., Chicago, September 19.

F. A. Torsch, 89, one of the founders of the Torsch Canning Co., Milford, Del., September 19, in Baltimore.

ASSOCIATED INDUSTRIES

L. H. Jones, for the past six years cheese packaging specialist for the pliofilm department of Goodyear Tire & Rubber Co., Inc., has resigned to devote full time to the management of his own firm, Packaging Supply Services, Kaukauna, Wis. The concern will specialize in the manufacture and sale of items required by the cheese packing industry.

Monsanto Chemical Co., St. Louis, has announced the promotion of Howard K. Nason to associate director of the central research department. He has been with Monsanto since 1936.

The National Association of Dairy Equipment Manufacturers is a new organization formed to "develop, promote and preserve useful standards of design, construction and quality in the manufacture of dairy equipment." Harry A. Sieck has been elected executive secretary with headquarters in Cleveland.

Niagara Filter Corp., Buffalo, has appointed Lester C. Books to its sales engineering staff. He will serve the Philadelphia, Wilmington, Baltimore, Washington and Norfolk area.

Shumann Equipment Co., Pittsburgh, has announced the appointments of Clarence J. Hoffman and Warren J. Randall as packaging engineers. Mr. Hoffman formerly was with Sylvania Industrial Corp., New York, and Mr. Randall comes to Shumann from Munson Bag Co., Cleveland.

CONSIDER DOWTHERM for HIGH TEMPERATURE (700°) HEATING AT LOW PRESSURE

When high and closely controlled temperatures are necessary, Foster Wheeler Dowtherm heating systems offer many advantages – uniform temperatures, high rate of heat transfer, flexible design to permit heating *and* cooling in the same cycle. Further, Dowtherm systems do not require expensive pressure parts – pressure remains low even at 700°F, upper recommended working temperature.

If you are looking for a solution to some problem of high temperature processing, write for more detailed information to

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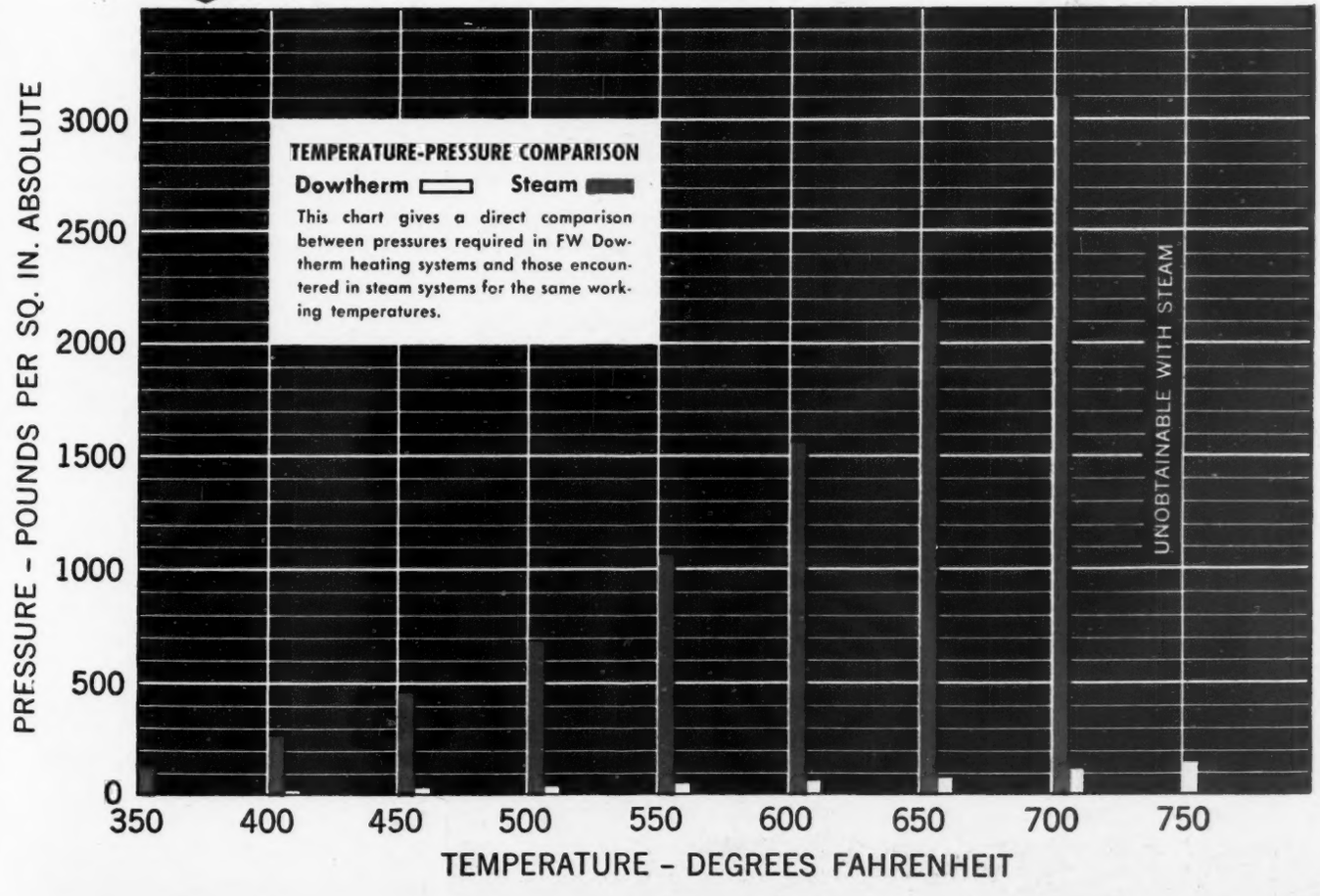
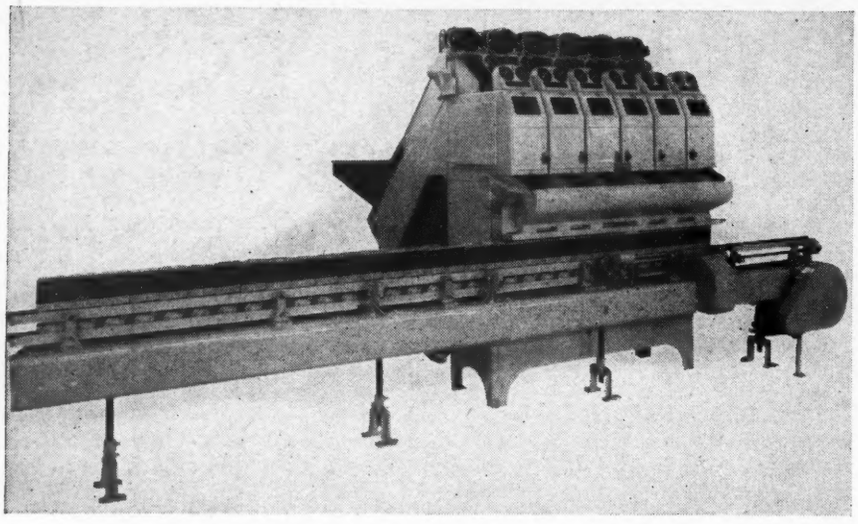


FOSTER WHEELER

FOOD EQUIPMENT NEWS



Model A6CA fully automatic "Elec-Tri-Pak" weigher

Ice Crushing Machine

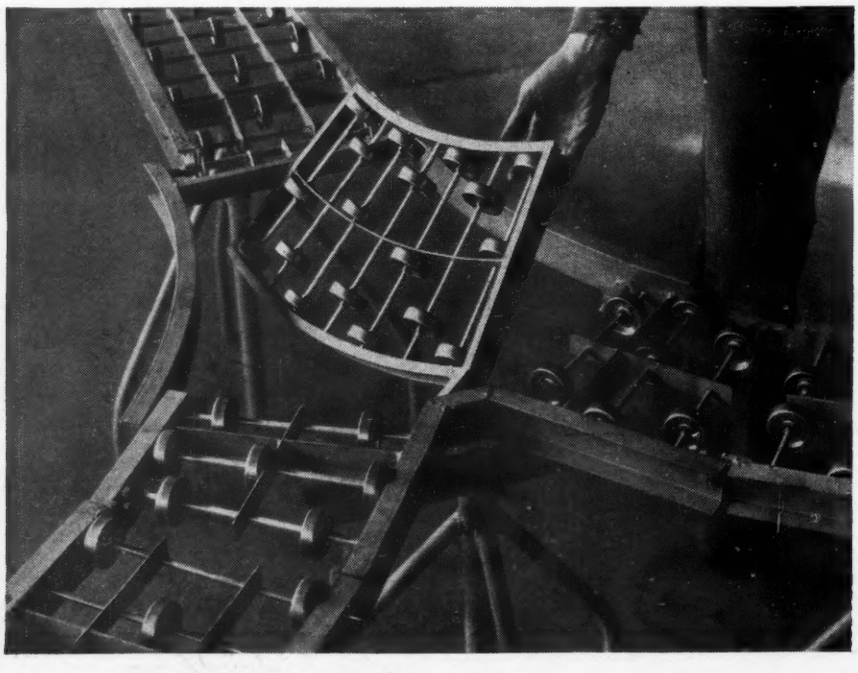
An ice crushing machine that can crush ten 300-lb. cakes of ice per minute virtually to snow is announced by Tri-Pak Shippers Equipment, Dept. I, San Juan, Texas. The texture of the ice can be regulated by the operators through a movable comb operated by a handwheel, also through the medium of a handwheel which regulates the speed at which the bar of ice is fed into the crusher drums.

"Y" Flipswitch

THE "Y" Flipswitch, manufactured by Speedways Conveyors, Inc. Dept. I, Buffalo, N. Y. uses the form of a "Y" with two limbs or arms at 45 deg. angles. This permits the flow of materials, cases, cartons, etc. in either direction simply by manually flipping the switch. All three end limbs of the "Y" are equipped with male studs and are easily and quickly connected to any other conveyor sections without the use of tools. It is available in 12-in., 15-in., 18-in. or 24-in. widths.

Weighers

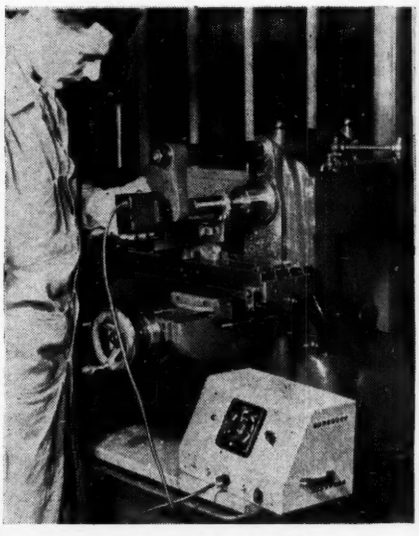
A LINE of automatic and semi-automatic machines for weighing and filling dry products into containers has been announced by the Triangle Package Machinery Co., Dept. I, 906 N. Spaulding Ave., Chicago 51. Production ranges from 15 to as high as 120 packages per minute depending upon the style of machine and the product being packaged. Typical products packaged by this equipment are beans, peas, rice, crackers, cookies, candies, coffee etc. Some models will weigh from as little as ¾ oz. up to 8 oz., others range from 1 oz. to 1 lb. and 4 oz. to 5 lb.



Gravity conveyor

Electronic Tachometer

AN ELECTRONIC tachometer designed for measuring rotating speeds from 300 to 50,000 rpm has been announced by General Electric Co., Dept. I, Schenectady, N. Y. It weighs 19 lb., and consists of a small pick-up head, six feet of flexible cable and a measuring unit with a panel-mounted indicating instrument reading directly in rpm.



Electronic tachometer

High Vacuum Valve

SIZES of ⅜ and ¾ in. are at present available in a new line of solenoid valves for high vacuum equipment recently announced by Distillation Products, Inc,, Dept. I, 755 Ridge Road West, Rochester 13, N. Y. The new valves are intended primarily for use where the time necessary for valve opening and closing plays an important part in the process. These valves are normally open, closing instantly when current is applied to the electromagnet.

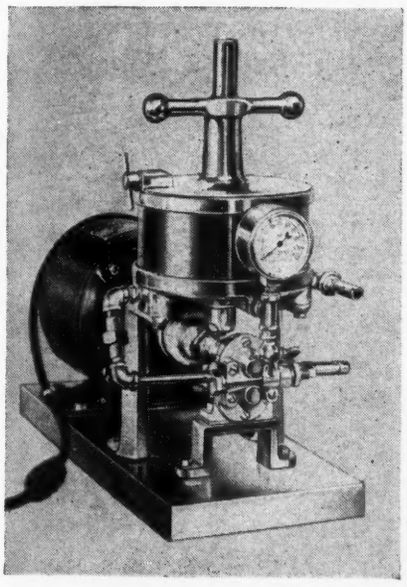
Percentage Timer

TYPE PE is the designation of a new percentage timer offered by the R. W. Cramer Co., Dept. I, Centerbrook, Conn. The device is one of a number of electrical control devices made by this company and is said to have a

wide variety of industrial applications in automatically controlling the percentage of time during which any electrical circuit is closed or opened out of a definite length of time. For example, the device may be used in the time percentage regulation of current input to electric ovens and furnaces or in regulating the proportional flow of materials into or out of processes. Graduations may be in percentages of time or directly translated to feet per minute, gallons per hour, degrees of temperature, etc. Such timers, intended for use on alternating current, are said to repeat within 0.25 percent of any given setting and to be rated for continuous service.

Small Filter

A BENCH model, "Sealed-Disc" type filter is announced by the Alsop Engineering Corp., Dept. I, Milldale, Conn. It uses asbestos discs which can be supplied in eight different grades for coarse or ultra-fine filtration. The unit is completely inclosed



Bench-model filter

and is so designed that when the handle on top is removed the entire filter can be taken apart for cleaning.

It has a positive pressure rotary pump and is made in from one- to six-gallons per minute capacities with filtration areas of from 40 to 1200 sq. in.

All Steel Motor

INDUCTION motors which have been redesigned and which are known as the "Life-Line" are announced by the Westinghouse Electric Corp., Dept. I, Buffalo, N. Y. The motor is more than 35 percent smaller in size than its predecessor, without having sacrificed any of its electrical properties. Starting torques have been increased as much as 134 percent per lb. of motor. It is equipped with self-lubricating bearings which require no attention

All steel motors on production line

for at least five years. Vibration and noise have been reduced to new low limits and insulation burn-outs will be reduced because of the new features in insulating materials and improved winding techniques.

Interval Timer

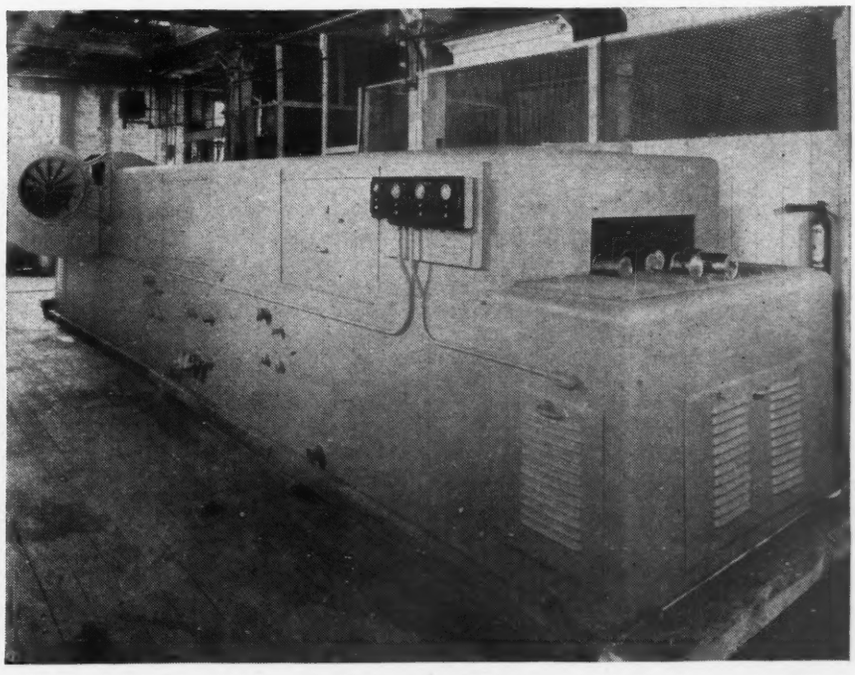
TO CONTROL the running time of process equipment the R. W. Kramer Co., Inc., Dept. I, Centerbrook, Conn., announces Model E Interval Timer. Many improvements in design and in construction have been made.

Can Washer

A MACHINE that washes, rinses and dries food cans before and after they are filled and processed is announced by the Howard Engineering & Mfg. Co., Dept. I, 2207 Buck St., Cincinnati, Ohio. The unit is made in a variety of sizes. In operation, the cans come to the machine on a conveyor belt which feeds automatically to the belt of the washer. The cans travel through the machine and are washed, rinsed and dried before being discharged upright on the packing conveyor.

Bellows Meter

AS AN ADDITION to its line of mercury manometer flow meters the Bristol Co., Dept. I, Waterbury 91, Conn., has developed a bellows type differential meter for applications where the mercury type of instrument is not desired. Known as the Bellows-Differential flow meter, the new instrument will be supplied as a mechanical, electrical or as a pneumatic transmission flow meter. Instruments will be available in a complete line of recording, indicating, integrating and automatic control models. The meter body of the new instrument, operating on a new principle, requires no mercury and



Washer and drier for cans

CHASE LINERS

* Stop Liner Breakage!
* Stretch in All Directions!

Chase Liners are better, more resilient, more flexible! Here's why: they're crinkled for vertical elasticity *and* pleated for horizontal elasticity! Result: no more broken liners nor costly damage to contents due to liner failure or breakage.

Check on Chase Liners today. They're the crinkled and pleated liners that assure savings . . . that actually cost no more!

CHASE BAG CO.

GENERAL SALES OFFICES
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BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MINNEAPOLIS
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BUFFALO • KANSAS CITY • MEMPHIS • GOSHEN, IND. • PHILADELPHIA
NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY • OKLAHOMA
CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS
CHAGRIN FALLS, O. • HUTCHINSON, KAN. • WINTER HAVEN, FLA.

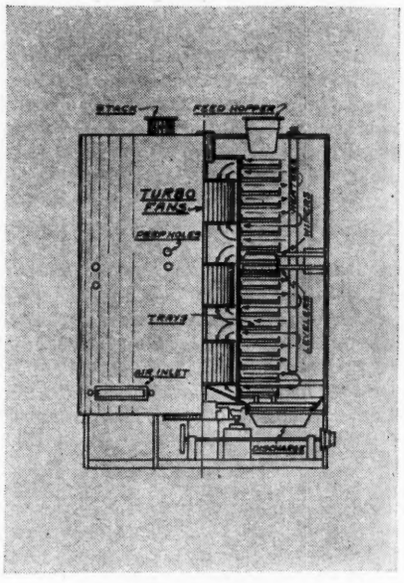
uses a unique method of transmitting the bellows motion to the pen arm. The new method is said to isolate the meter body shaft completely from the measured fluid.

Fire Fighter

A FIRE extinguishing unit designed to furnish highly effective fire protection for a wide range of outdoor industrial fire hazards has been introduced by Cardox Corporation, Dept. I, Bell Building, Chicago, Ill. The unit has a capacity of 750 lb. of low pressure liquid carbon dioxide and 32 gal. of mechanical foam solution. Its two specially engineered, long range carbon dioxide nozzles, each with 100 ft. of ¾ in. hose, have a combined discharge rate of 400 lb. of carbon dioxide per minute. A foam gun, on a 100-ft. ½ in. hose line has a discharge rate of 18 gal. per min., with pressure supplied by the carbon dioxide. Two extinguishing agents supplement each other.

The unit is a compact four wheel trailer, using standard automobile wheels and front axle assembly and 6:00 x 16 tires. With a wheelbase of 52 in., front and rear tread widths of 58 and 60 in. respectively and an overall height of 5 ft. 4 in., it exhibits exceptional stability even when hauled at high speed. Tool compartments provide space for equipment and tools needed in fire fighting operations. Low pressure liquid carbon dioxide is stored in the trailer in a single insulated refrigerated pressure vessel at a controlled temperature of approximately 0 deg. F. and 300 lb. per sq. in. At this temperature the liquid carbon dioxide yields 47% CO_2 "snow." This high yield of CO_2 "snow" provides increased cooling effect and effective projection by the patented Cardox nozzles.

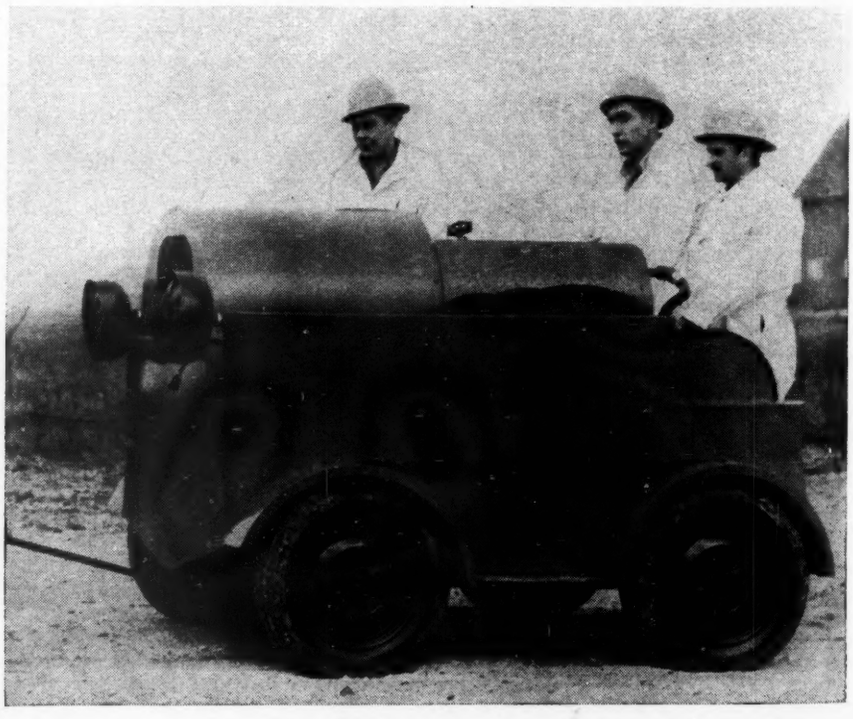
Under conditions closely simulating actual industrial fires, this unit has successfully extinguished fires involving approximately 200 gal. of gasoline burning over a wide area on two or more levels.



Turbo-continuous drier

Turbo Drier

TURBO continuous driers are announced by Wyssmont Co., Dept. I, 277 Broadway, New York 7. They consist of a series of circular shelves each of which is made up of a number of trays with a relatively small space between trays. The opening between trays in one shelf is located at the be-



Fire fighter for industrial hazards

Are you *taking advantage* of the Patapar printing service?

Printing Patapar* Vegetable Parchment in beautiful colors is a specialty with us. All day long our presses, manned by expert craftsmen, are turning out colorfully printed Patapar — in one color, two colors, several colors.

If you want your Patapar printed, let us know. We'll create designs for you, make sketches, suggest color combinations. We'll take care of every detail right up to the delivered job.

Ask us to include the Keymark

Millions of women have come to know the Keymark from Patapar advertisements in national magazines. And when they see it on a food wrapper, they know the product inside is well protected — because Patapar has high wet-strength, resists grease, and is pure in texture.

Next time you order printed Patapar wrappers ask us to include the Keymark. It's a way to remind customers that your product is well protected. It costs you nothing extra.

●

*Reg. U. S. Pat. Off.

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if it's a

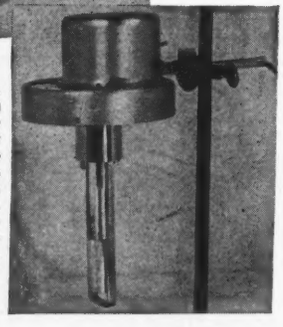
BROOKFIELD
SYNCHRO-LECTRIC
VISCOSIMETER

Making Viscosity tests at point of process is a snap with the Brookfield Viscosimeter. All you need is a convenient electrical outlet and you're set to take readings of high accuracy in 30 seconds.

Readings given directly in centipoises over wide ranges. Temperatures up to 600° F. No adjustments necessary. Requires no technical skill.

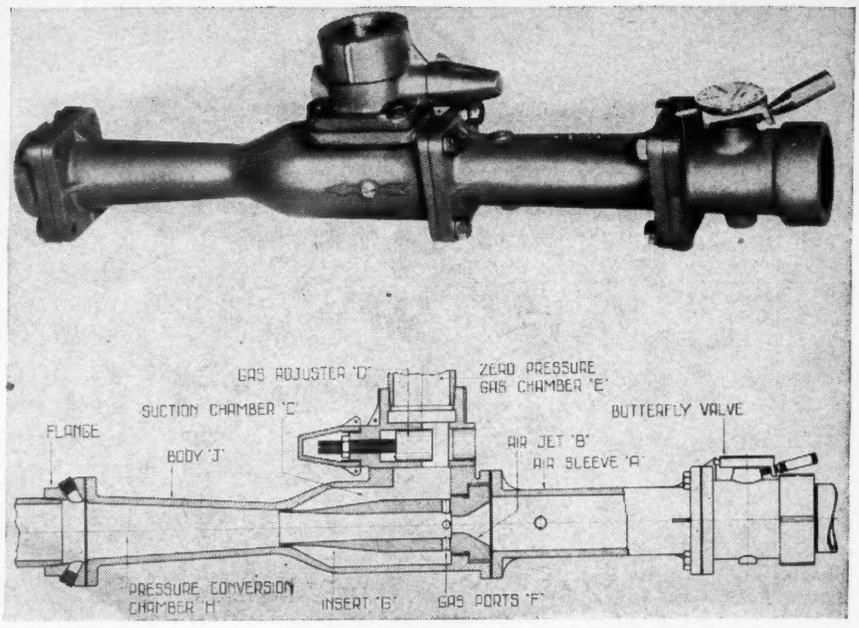
PORTABLE!
USE IN PLANT OR LAB

Same instrument can be used in both plant and lab Use as a portable instrument shown at left Operates on 60 cycle 110 volt current



When instrument is needed for stationary use only it may be mounted on a rod clamp as shown at right. Handles are interchangeable.

BROOKFIELD
ENGINEERING LABORATORIES
BOX 603-F, SHARON, MASS.



Industrial air and gas mixer

ginning of a tray in the next lower shelf. Continuous drying operation is obtained by repeated transfer and spreading of the material during its travel from top to bottom. The material dries in a uniformly thick layer for a full revolution of each successive shelf. As the material is gently wiped from each tray to a tray in the lower shelf, it forms piles which are spread and leveled, thus exposing new surfaces to the drying current with each transfer.

The central fan system provides internal reheating and recirculation which are prerequisites for high thermal and high fan power efficiencies. Both parallel and counterflow air circulation may be obtained.

The units are suitable for handling a variety of materials ranging from granular materials to pastes and thick slurries. Because of its dustless operation, it is suitable for materials which dry to a fine powder, such as starch, for example.

Odorless Insecticide

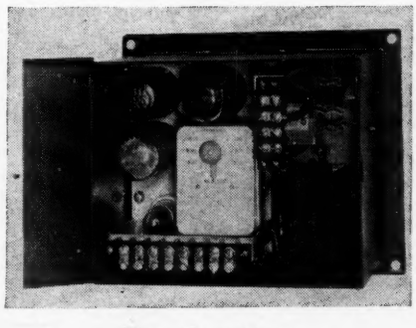
"DEADLINE" odorless insecticide said to provide a kill equal to its knockdown, has been announced by the American Oil & Disinfectant Corp., Dept. I, 88 Lexington Ave., New York 16. The product is a spray formulated by blending pyrethrum and 0.5 percent DDT in a light hydrocarbon distillate which is refined to complete freedom from kerosene odor. It is claimed to be effective against practically all types of flying and crawling insects.

Air-Gas Mixer

A CONSTANT-ratio mixer for low pressure air and gas with an efficiency of almost 50 percent greater than that of presently available equipment is announced by Bryant Heater Co., Dept. I, Cleveland, Ohio. The "Flomixer" utilizes the energy of a stream of air at pressures up to 3 lb. to entrain a combustible gas and to deliver the mixture at unusually high pressure to the burners it supplies. Accurate gas-air proportions are maintained at all rates of flow, as long as zero pressures gas is supplied. The gas ratio adjuster is a universal type suitable for any type of gas. Gas from 550 to 3200 Btu. can be handled.

Thermal Protector

A THERMAL protector—a thermocouple actuated limit switch— that gives protection from excessive temperature is announced by Manning, Maxwell & Moore, Inc., Dept. I, Bridgeport, Conn. It is designed with two ranges, 100 deg. F. to 1000 deg. F., using an IC couple and 800 deg. F.



Thermal protector

to 2000 deg. F. using an AC couple with an accuracy of 2 percent of the range at a set point. Two or more couples may be connected, in series if desired. The cold junction is located in the unit and is compensated to ambient temperatures of 50 deg. F. to 135 deg. F. and a relative humidity up to 100 percent. As an example of its application it can be used where protection is required in air ducts on

Another BECKMAN pH Advancement!

THE BECKMAN MODEL H PORTABLE AC pH METER

Some Important Features of The Beckman Model H

Full AC Operation: The Model H is completely self-contained and operates directly from standard 115 volt AC lines without accessory equipment of any kind.

High Accuracy: The accuracy of the Model H instrument is equivalent to that of the well known Model M and Model G Beckman pH Meters. For rapid work, accuracies of 0.1 pH unit are easily obtained, and more careful attention to technique permits determinations to 0.02 pH units. Such high accuracy has never before been available in a compact AC pH Meter.

Single-Point Buffer Calibrations: With the Beckman Model H it is not necessary to calibrate with two buffer solutions. The Model H incorporates a unique electronic circuit that permits accurate readings regardless of variations in resistance of the glass electrodes due to aging or due to electrode temperature changes after calibrations. This important advantage is accomplished without need for multiple buffer calibrations.

Maximum Temperature Stability: After a short warm-up period, subsequent change in calibration of the instrument due to temperature effects is very small—only about 0.1 pH unit in the first two hours and 0.05 unit subsequently. When maximum accuracy is required, this change may be instantly checked and corrected *without rechecking against buffer solution.*

Full Temperature Compensation, 0 to 100° C: A built-in temperature compensator covering the full range of 0° to 100° C can be set to compensate automatically the effect of temperature changes on the EMF of the glass electrode over the entire pH range of the instrument. Thus, the pH at the electrode temperature may be read directly from the dial without calculation or corrections.

Direct Millivolt Scale: The Model H Meter is graduated in millivolts as well as pH units, and a range switch permits measuring directly either in millivolts or pH at will.

Rugged Lightweight Construction: The Model H is housed in a cast aluminum case with an attractive dark gray wrinkle finish. The instrument weighs approximately 10 pounds, complete, and is easily carried. For maximum operating convenience the meter dial and all controls are mounted on a sloping panel.

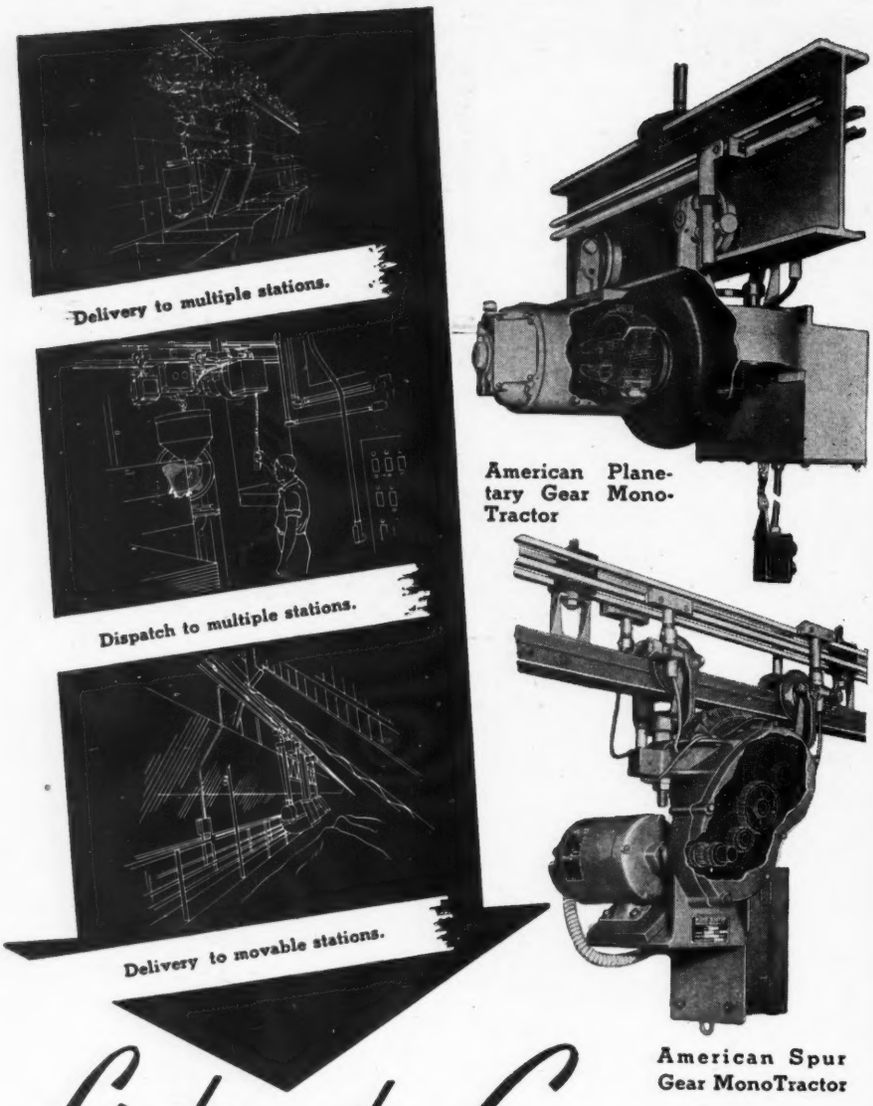
The First Portable AC pH Meter with DC Accuracy, Simplicity and Dependability

NO LONGER need you sacrifice accuracy and dependability to get the convenience of AC operation in a portable pH Meter. For now the same organization that pioneered modern glass electrode pH equipment, and has pioneered every major advancement in modern pH instrumentation and methods, brings another important development...a portable pH Meter that operates from standard AC current *without sacrificing any of the accuracy and dependability that are so essential in modern pH applications.*

This new instrument—the Beckman Model H pH Meter—has been in development over a long period of time. Many different designs and circuits were tested and rejected before an instrument was perfected that meets the rigid Beckman standards of excellence. The Model H Meter is not just an "AC" pH Meter. It is an instrument embodying advancements in circuit design that insure the same high operating efficiency and accuracy that have made Beckman pH Equipment standard throughout the world.

A few of the many unique features incorporated into the Beckman Model H pH Meter are outlined at right. Contact your nearest distributor of Beckman pH Instruments for further details...or write direct. *Beckman Instruments, National Technical Laboratories, South Pasadena 18, Calif.*

BECKMAN **INSTRUMENTS CONTROL MODERN INDUSTRIES**



American Planetary Gear MonoTractor

American Spur Gear MonoTractor

Automatic Carriers
FOR OVERHEAD HANDLING

Through the application of simple electrical and mechanical devices, American MonoTractor Units perform automatic operations with extreme accuracy and reliability, saving costly handling labor and supervisory attention.

While unique in many features, such systems are built mainly from standard units. MonoTractors can be applied to carriers operating on any smooth bottom track. An American MonoRail Engineer is available for consultation in every important industrial area.

SEND FOR BULLETIN C-1 A 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

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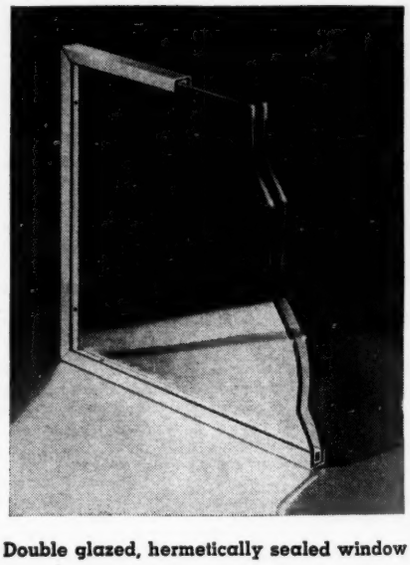
industrial ovens, driers, bearings of large motors, blower wheels, flue gas stacks of boilers and similar operations. The temperature chosen as the high limit is set by an operating knob located inside the case where it will not be tampered with. If this temperature is reached, the device will stop the apparatus before excessive damage is done, or it can be arranged to sound an alarm or light a light, or all functions can be performed at the same time.

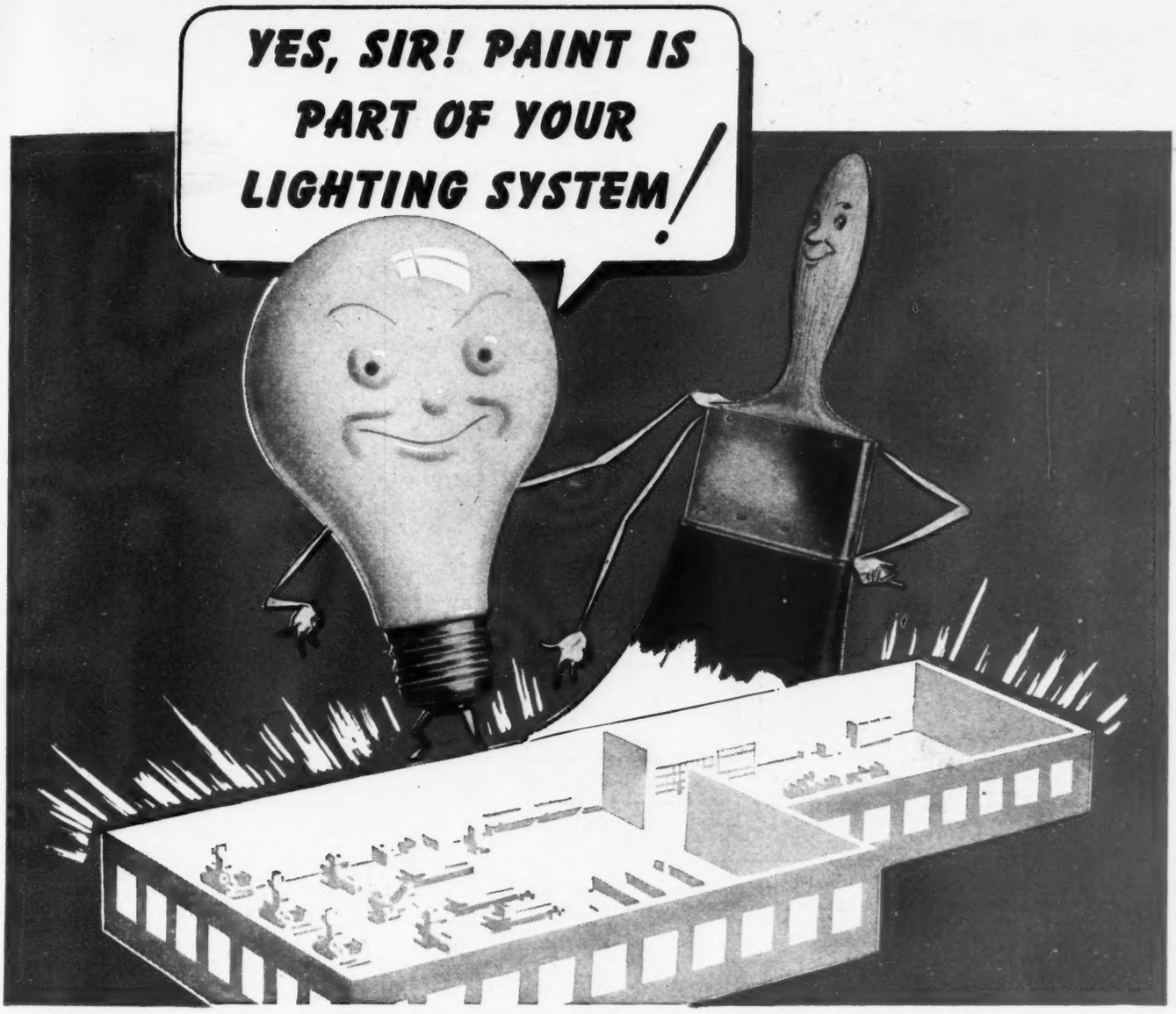
The current characteristics are 115-230 volts, 60 cycle, AC 15-20 watts. There are no open contacts in the device and the circuit for the signal and power input to the apparatus is a standard 4 amp. 250 volt mercury switch.

Insulating Window

AN EFFICIENT double-glazed window insulating unit known as "Twindow" for industrial or commercial use is announced by the Pittsburgh Plate Glass Co., Dept. I, 632 Duquesne Way, Pittsburgh 22, Pa. Twindows are integral insulating units of two or more plates of glass enclosing a quarter inch or half inch hermetically sealed air space. One of the features of the unit is the use of hollow aluminum tubing to separate and hold the glass plates in position. The entire unit is framed with a light-gage stainless steel channel, 0.015 to 0.020. The channel legs extend ⅛ in. inward on the surface of the glass from the base around its periphery to give maximum protection during installation and use. The hermetically sealed dead air in the space between the plates of glass is held at atmospheric pressure. It is dehydrated initially by means of a drying agent within the aluminum spacer tubing, which has access to the air space through holes adjacent to the internal corners. This provides a perfect hermetical seal. The drying agent or desiccant remains in the unit and provides added insurance against the slightest vapor diffusion and helps



Double glazed, hermetically sealed window



THE TREND toward higher industrial lighting levels is a healthy and hopeful sign. Surveys show but one plant in 100 has enough light for the quick, easy, accurate seeing so necessary to fast, efficient production.

But in planning lighting installations, don't forget to include **PAINT** in your calculations. For paint, too, is part of your lighting system!

WHITE has far greater diffuse reflectivity than any other color. White-painted ceilings and walls, therefore, assure maximum efficiency from lighting fixtures. And, equally important, they help to distribute the light evenly throughout the working area and thereby banish those three arch-enemies of good seeing; glare, harsh shadows, and extreme brightness-contrasts.

For down-to-earth data on the relationship between Light, Paint and Seeing, let us send you a copy of "Light and Color in the Work-World." To get your copy, just fill out and mail us this coupon TODAY.

BARRELED SUNLIGHT

PARTNER IN LIGHT

FOR NEARLY HALF A CENTURY

U. S. GUTTA PERCHA PAINT COMPANY
37K Dudley Street, Providence 1, Rhode Island

I'd like to know more about the partnership of light and white paint. Send me a copy of "Light and Color in the Work-World."

COMPANY.....

STREET AND NUMBER.....

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MY NAME IS.....

MY TITLE.....

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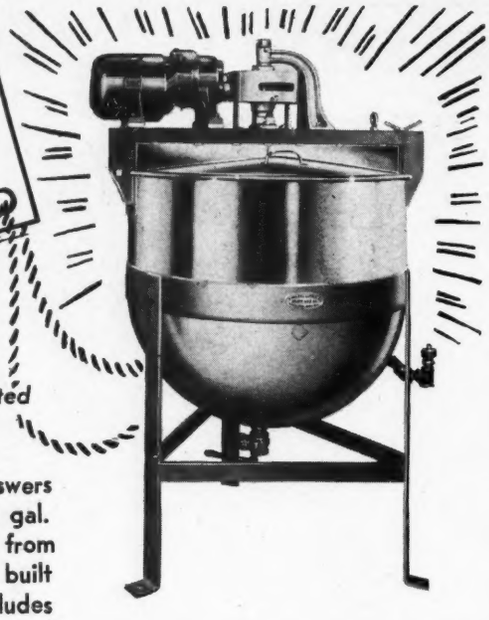

HAMILTON

Stainless Steel—Steam Jacketed

KETTLES

Here's the kettle that answers heavy demands. Capacity is 30 gal. to 500 gal. Outlets furnished from 1½" to 5" dia. Standard kettles built for 90 lbs. working pressure. Includes single or double motion stainless steel agitators. Also fabricated in copper (plain or tinned interior).

HAMILTON COPPER & BRASS WORKS, INC.
HAMILTON, OHIO

Gentlemen: Without obligation please send complete information on your kettles.

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Established 1876
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Keep This Tested and Proven War-Time Veteran on the Job

In many plants TARBONIS practically eliminated dermatitis resulting from the handling of a wide variety of foodstuffs, too long immersion of hands in brine, constant contact with acid-type foods, etc., during the war period. Let it aid your peace-time production. Effective in clearing up a high percentage of stubborn skin conditions encountered in industry . . . not merely a protective. Easy to apply—nothing to remove. Odorless, greaseless, stainless.

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For generous sample and literature, fill in, attach to your letterhead, and mail.

Company.....

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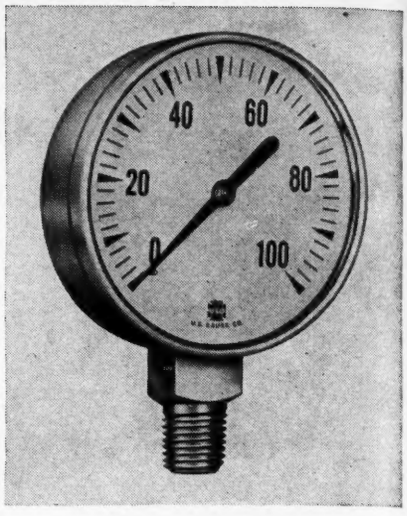
By.....*Department*.....



Modernized U. S. gage

considerably in meeting more than normal atmospheric changes.

Clear polished plate glass is used in their construction. However, the units can be fabricated with special glasses to meet particular needs.

They combine clear vision and high insulating values and thus are recommended for frozen food cabinets and similar uses.

Gages

A LINE of streamline gages in a modernized eye-appealing design is announced by the United States Gage Division, American Machine & Metals, Inc., Dept. I, 14 Wall St., New York 5, N. Y.

Drum Sling

DESIGNED for hoisting drum-type containers, the Trylon safety drum sling introduced by Wire & Cable Division of the Wind Turbine Co., Dept. I, West Chester, Pa., is said to make possible the handling of heavy drums, barrels, kegs and similar large containers with both ease and safety. Heavy clips mounted on a rod with an adjustable pressure spring at each end grip the container securely until it is delivered. Spacing of these clips can be quickly altered to fit any size container. The unit is capable of handdling any weight of load normally encountered in such containers.

Pirani Tubes

PIRANI tubes suitable for pressure gages and leak detectors in evacuating apparatus and automatic pressure recording equipment are available from the Electronics Division, Sylvania Electric Products, Inc., Dept. I, 500 Fifth Ave., New York 18, N. Y. The tubes are designed with special tungsten filaments having a high temperature coefficient of resistance, permitting direct readings of gas pressure. Change in gas pressure produces a change in thermal conductivity, filament temperature and filament

for Salad Dressings Only

a One-Purpose Starch with a longer shelf life

PURITY "PWS" is a complete salad dressing starch that... cooks to a creamy, glossy paste . . . cools to a smooth consistency that blends uniformly with the emulsion . . . ages without losing its original creamy texture and gloss.

We invite you to test the longer shelf life of PURITY "PWS". It is a superior food starch—especially developed by National's Food Laboratory research—for salad dressings only. It is complete in itself. It ends the need of blending two or more starches in your shop—and eliminates all variations in salad dressing quality caused by shop errors in weighing.

PURITY "PWS" has been thoroughly tested in commercial use. It has a bland flavor . . . is snowy white . . . absolutely pure. It produces superior salad dressings with a creamy texture . . . excellent appearance . . . and a delightful tang that is free of the cereal flavor found in ordinary corn starch.

Write for National's new handbook: SALAD DRESSING PRODUCTION. It provides a basic understanding of the ingredients, operating procedures and formulas—that make a salad dressing a delicately balanced food product.

National also produces: PURITY "C", a quality starch thickener for fruit fillings; MELOJEL, a better all-purpose food starch; FLOJEL candy starches in all accurately controlled fluidities; MOLDING STARCH, properly lubricated for gum drops, etc.; PURITY GLAZE, an oil-sealer for coating almonds; and AMIOCA, the new domestic starch.

Offices: 270 Madison Avenue, New York 16; Boston, Philadelphia, Chicago, Indianapolis, New Orleans, San Francisco and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In Holland: Nationale Zetmeelindustrie, N. V. Veendam.

National
STARCH PRODUCTS

STARCHES — *AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY*

NUKEM

The Perfect Floor for any Food Processing Plant

A floor by NUKEM, because of its versatile features, represents an investment rather than an expense. Tailor-made to meet the operating conditions in any given plant, these installations spell the end to floor problems.

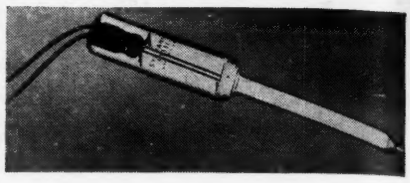
Milk, fruits, vegetables, meats, juices, oils and sugars —all form corrosive food acids which are deadly to ordinary floors. The deteriorating effect of continual washings with strong alkaline cleaning compounds present another hazard to floors in Food Processing plants. None of these elements have any effect whatsoever on NUKEM constructed floors.

Durable, leak, corrosion and wear proof, NUKEM brick or tile constructed floors, backed by long experience, are particularly recommended for overcoming the floor problems in packing plants, canneries, dairies, ice cream and other food processing plants.

A new bulletin describing NUKEM FLOORS is available on request.

NUKEM Products CORPORATION

108 COLGATE AVENUE, BUFFALO 20, N. Y.



Pirani tubes

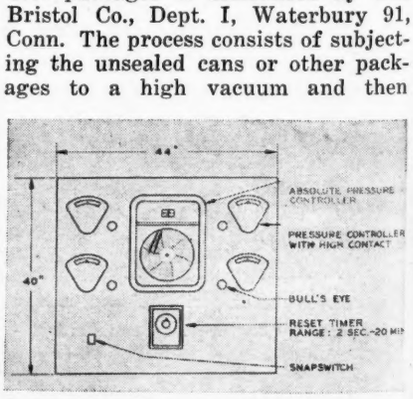
resistance. Measurement of filament resistance, calibrated in terms of pressures for individual gases, is indicated on an 0-1 milliameter placed in a simple bridge circuit. Readings may be obtained with plus or minus 5 percent accuracy within a pressure range of one to one thousand microns. The tubes are supplied with Nonex glass envelopes with tabulation for direct sealing into apparatus. Overall length of the tube is approximately eight inches. They are designed to operate at 1.5 volts, 100 milliampers. Cold resistance of the filament is 6.6 ohms. Hot resistance at 100 milliampers in evacuated tube ranges from 15.5 to 17.0 ohms.

Mildew-proofing Agent

MARKETED under the brand name of Nuocides, a new line of fungicide concentrates is now available from the Nuodex Products Co., Inc., Dept. I, 743 Magnolia Ave., Elizabeth, N. J. Nuocides are solutions of liquid emulsion bases designed for controlling mildew or rot in textiles, lumber, paints, cordage and other similar products. A good degree of resistance to mildew and rotting can be obtained from treatment with the different Nuocides which include both solvent and water soluble preparations. These fungicides include materials which are microbiostatic in that they arrest or inhibit microbial growth; others are microbiocidal in that they destroy micro-organisms. Various adhesives can be made mold-resistant with these fungicides. Casein and non-casein plastics have been protected against mildew growth, and rotting of wood in its various forms may be prevented.

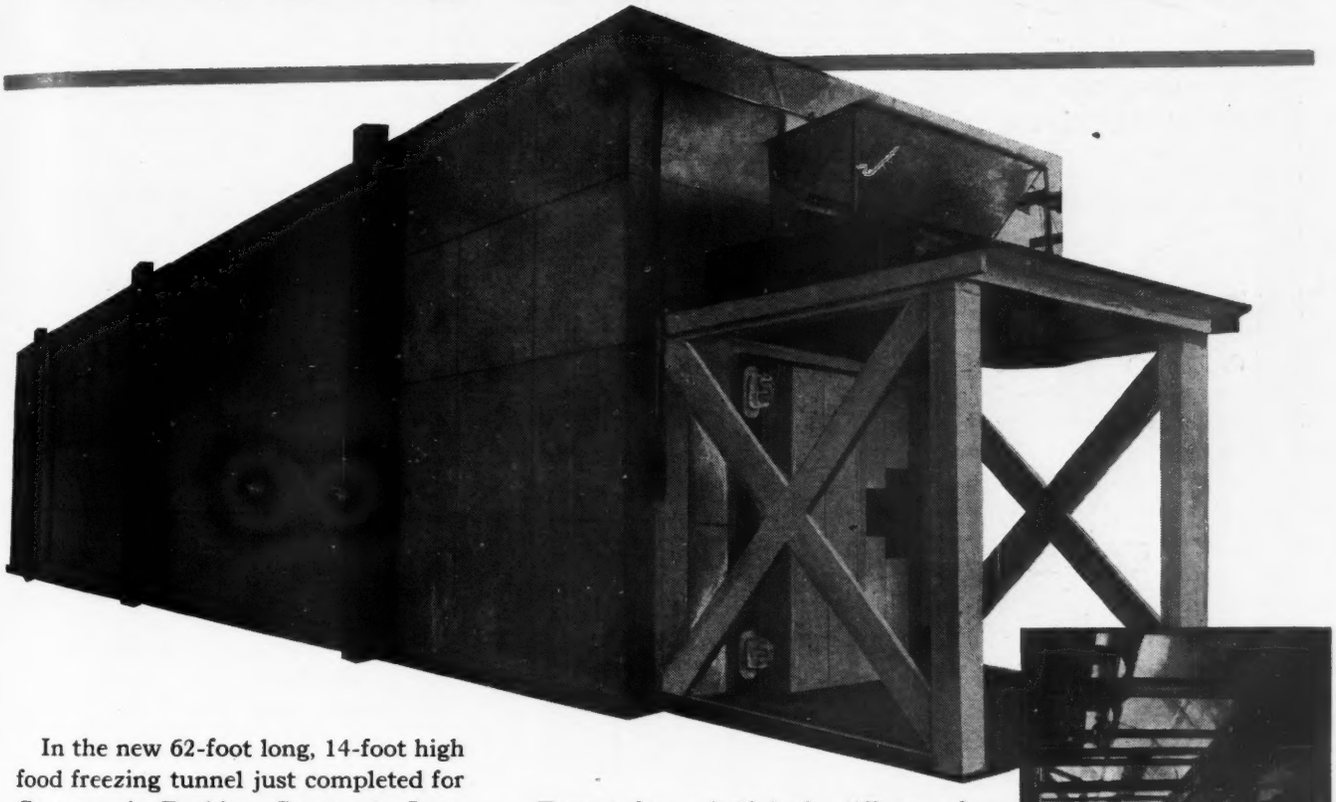
Evacuation Control

AUTOMATIC control for multiple unit evacuation and gassing of food products packages is announced by The Bristol Co., Dept. I, Waterbury 91, Conn. The process consists of subjecting the unsealed cans or other packages to a high vacuum and then



Automatic control for multiple unit evacuation and gassing of food products.

New freezing tunnel takes full advantage of Corkboard's STRENGTH



In the new 62-foot long, 14-foot high food freezing tunnel just completed for Consumer's Packing Company, Lancaster, Pa., Armstrong's Corkboard handles two important jobs. In addition to providing efficient insulation, it's also the principal material used in construction. And in both roles it saves money for Consumer's.

Operating costs of this big tunnel will stay low because 10 inches of efficient corkboard in walls, ceiling, and floor help maintain correct temperature levels with a minimum of refrigeration.

Construction costs were reduced because the strength of corkboard permits simplified design. In the floor, corkboard supports a concrete wearing surface 4 inches thick, plus coils, fans, conveyor, and foods being processed.

Except for a half inch stiffener of portland cement plaster, the walls are all corkboard. They carry the entire tunnel roof structure, which utilizes standard "T" iron construction.

Economical, self-supporting construction is only one of the advantages corkboard gives you. When you plan to build or remodel refrigerated space, it pays to get the whole story. Call in the Armstrong man. He can give you the benefit of Armstrong's more than 40 years' experience with low-temperature insulations. No obligation. Just write or phone Armstrong Cork Company, Building Materials Division, 4211 Concord Street, Lancaster, Pennsylvania.

Sheet metal contour linings direct the flow of air from ten 32" axial-flow fans. 13,560 ft. of coils supply refrigeration at 30° below zero. The tunnel provides two types of freezing facilities—a chain belt for loose freezing and a track and truck system for package freezing. Capacity is 4,000 lbs. of frozen foods per hour.

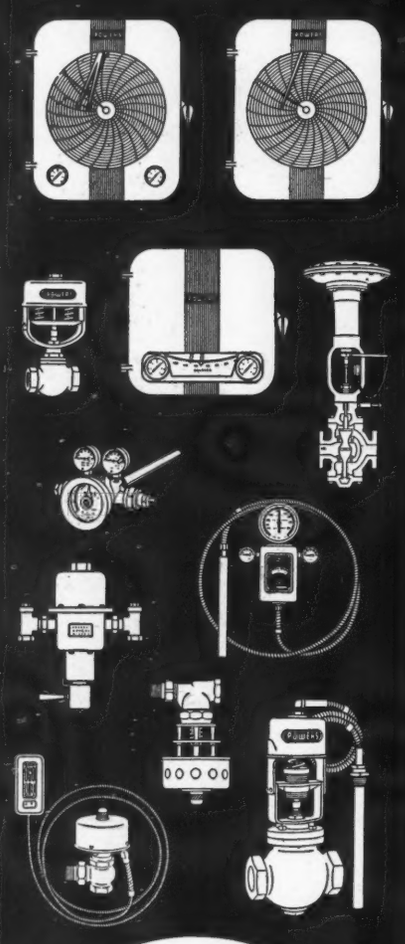
ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero

To 2600° Fahrenheit

POWERS
TEMPERATURE and HUMIDITY
CONTROL



When you want accurate and dependable automatic temperature or humidity control for Industrial Processes, Heating or Air Conditioning Systems, call in a Powers engineer. With over 50 years of experience and a very complete line of self-operating and air operated controls we are well equipped to fill your requirements.

Write for Circular 2520
2793 Greenview Ave., Chicago
Offices in 47 Cities—See your phone directory.

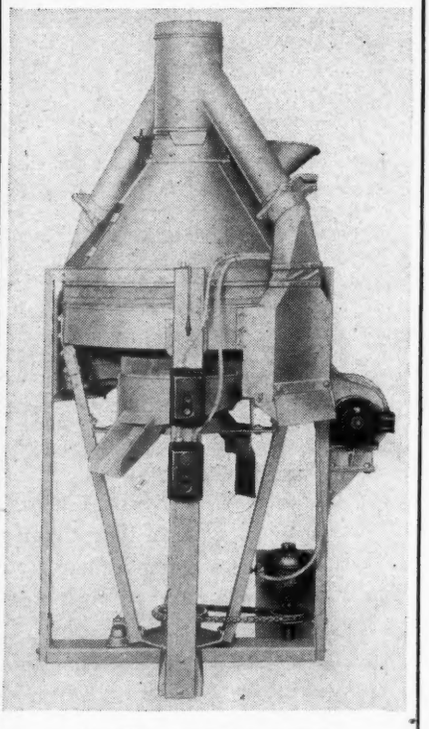
THE
POWERS REGULATOR CO.

introducing an inert gas such as nitrogen under pressure before the packages are sealed. The automatic control system is designed so that a bank of two or more machines can be handled by one set of operators who merely load and unload the retorts in any order and as each is closed and sealed the operator pushes a start button and moves on to the next machine. The control equipment then takes over and processes each batch as soon as the preceding one has completed its cycle.

The automatic control equipment consists of a retort selector, a timer, and an absolute pressure gage with low pressure adjustable contacts. In addition, two relays, two control valves and an indicating pressure controller are required for each machine.

Separators

SPECIFIC gravity separators designed to classify materials effectively according to their relative densities are announced by Bauer Bros. Co., Dept. I, Springfield, Ohio. Separation is accomplished by subjecting the materials



Specific gravity separator

to a combination of mechanical forces and air currents. The material to be processed is held in a buoyant state on a perforated deck. The latter imparts mechanical impulses of controllable density sufficient to cause the mass to rotate about the axis of the deck until classification results. The buoyant effect produced by the air currents causes lighter materials to travel to the outside edge of the deck for discharge. The heavy material travels counter to the air currents and because of its higher density, mechanical impulses are sufficient to discharge it at the center.

The mechanical impulse is provided

CASE HISTORY No. 10

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)

	Burlap Bags	Paper Bags
Container cost	$2.18	$1.70
Labor cost	.55½	.30½
Total bag and labor cost	$2.73½	$2.00½
Saving, paper over fabric		73¢

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER ✔
CHEMICALS	FOOD
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR ✔
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC ✔
FLUFFY	LIGHT
FREE-FLOWING	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

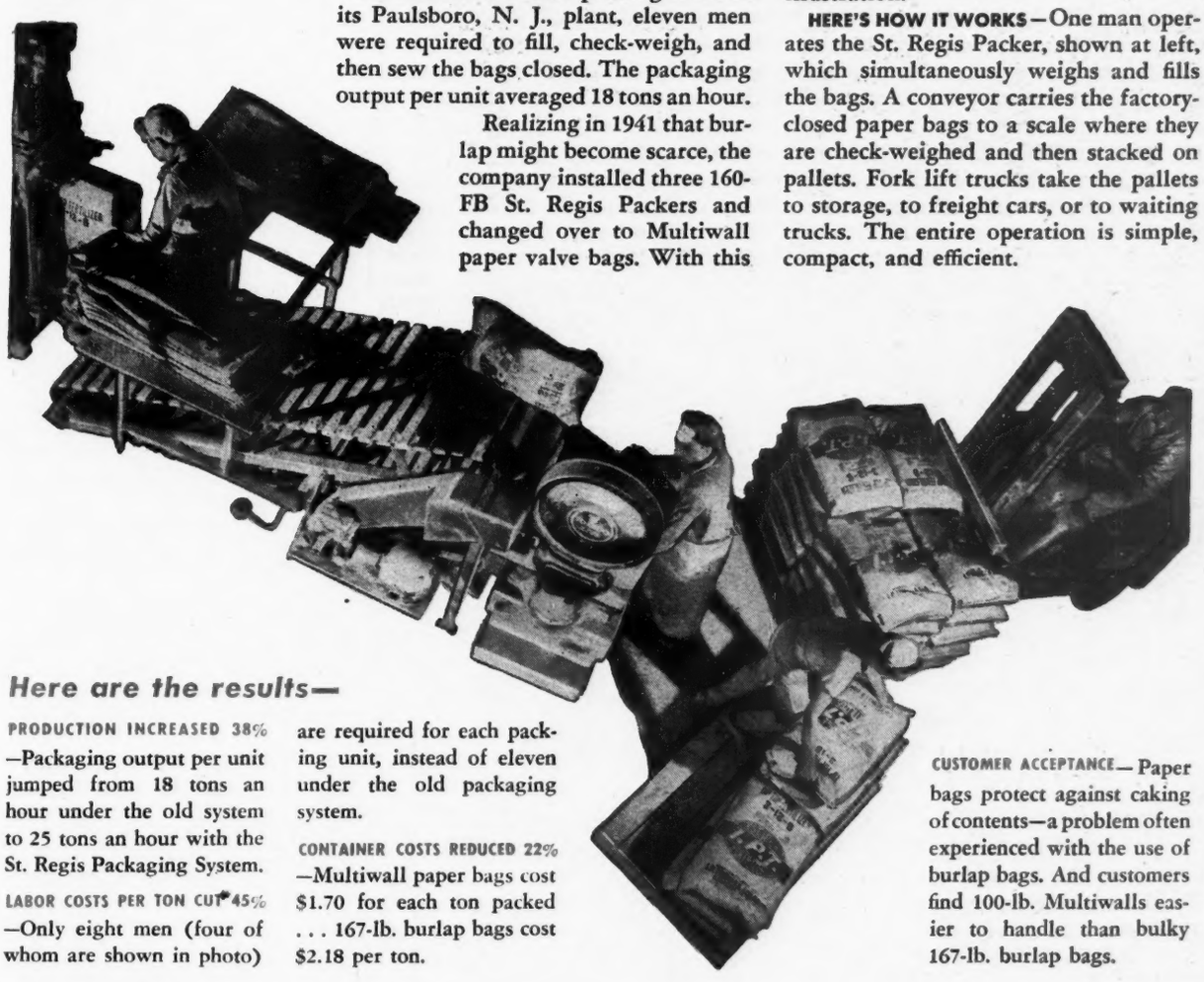
BIRDS EYE VIEW OF PACKAGING EFFICIENCY

Up to 1940, I. P. Thomas and Sons Co., of Camden, N. J., packed its mixed fertilizers in 167-lb. open mouth burlap bags.

At each of the three packing units in its Paulsboro, N. J., plant, eleven men were required to fill, check-weigh, and then sew the bags closed. The packaging output per unit averaged 18 tons an hour.

Realizing in 1941 that burlap might become scarce, the company installed three 160-FB St. Regis Packers and changed over to Multiwall paper valve bags. With this equipment as a basis, the company put into operation the highly efficient St. Regis Packaging System shown in the illustration.

HERE'S HOW IT WORKS—One man operates the St. Regis Packer, shown at left, which simultaneously weighs and fills the bags. A conveyor carries the factory-closed paper bags to a scale where they are check-weighed and then stacked on pallets. Fork lift trucks take the pallets to storage, to freight cars, or to waiting trucks. The entire operation is simple, compact, and efficient.



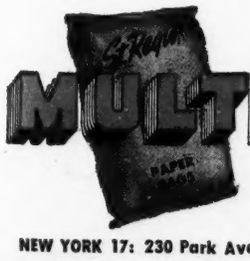
Here are the results—

PRODUCTION INCREASED 38%—Packaging output per unit jumped from 18 tons an hour under the old system to 25 tons an hour with the St. Regis Packaging System.

LABOR COSTS PER TON CUT 45%—Only eight men (four of whom are shown in photo) are required for each packing unit, instead of eleven under the old packaging system.

CONTAINER COSTS REDUCED 22%—Multiwall paper bags cost $1.70 for each ton packed . . . 167-lb. burlap bags cost $2.18 per ton.

CUSTOMER ACCEPTANCE—Paper bags protect against caking of contents—a problem often experienced with the use of burlap bags. And customers find 100-lb. Multiwalls easier to handle than bulky 167-lb. burlap bags.



ST. REGIS SALES CORPORATION

(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave. CHICAGO 1: 230 No. Michigan Ave.
BALTIMORE 2: 2601 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St.

Mail this coupon for the complete story

Allentown Birmingham Boston Cleveland Dallas Denver Detroit Franklin, Va. Los Angeles Nazareth, Pa. New Orleans No. Kansas City, Mo. Ocala, Fla. Oswego, N. Y. Seattle Toledo

IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

Without obligation, please send me full details regarding "Case History" No. 10, outlined above.

NAME_____

COMPANY_____

ADDRESS_____

Available for Immediate Delivery

Cuts Handling Costs... Speeds Deliveries!

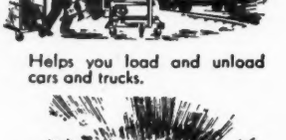
LAMSON UTILITY CONVEYOR

it's Portable...Adjustable...Reversible

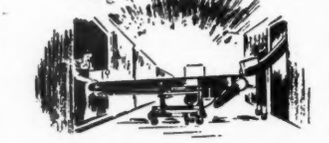
MAIL the coupon today for folder showing the 101 uses of this handy conveyor. It shows how you can save time and labor in loading and unloading freight cars, trucks and planes . . . in stacking and unstacking cartons in your warehouse . . . how you can increase the travel of your gravity conveyors and feed an overhead conveyor at any point along the line.

Lamson Corporation—a pioneer manufacturer of materials handling conveyors—offers a limited quantity of this guaranteed utility conveyor for immediate delivery.

Helps you load and unload cars and trucks.

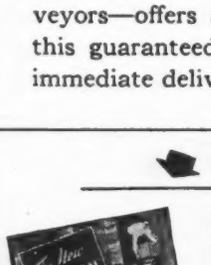


Spans dock from warehouse to freight car.



Acts as Booster between two portable, roller gravity conveyors.

SEND COUPON FOR FOLDER



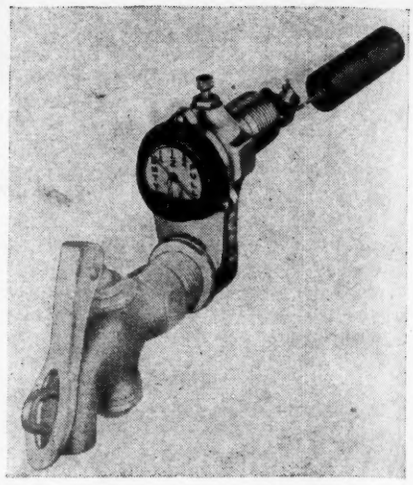
Lamson Corporation
1050 Lamson St.
Syracuse 1, N. Y.

Send me, without obligation, your folder and prices on the Lamson Utility Conveyor.

Name.....

Company.....

Address..... State.....



Liquid level indicator

by an eccentric weight, which is driven by a small motor mounted at the base of the machine.

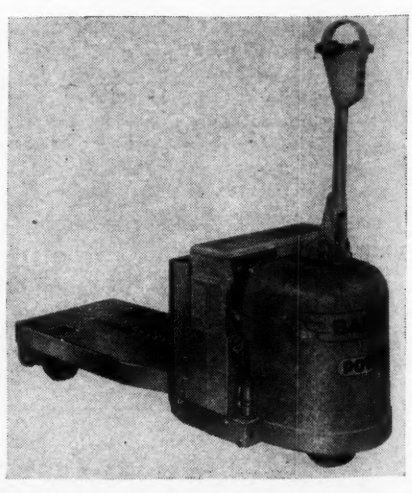
By combining mechanical impulses with the buoyant effect created by air currents, sharp classifications on various food products can be obtained.

Liquid Level Indicator

A VOLUME indicator that reveals the contents of steel drums at a glance is announced by U. C. Indicator Co., Dept. I, 152 West Wisconsin Avenue, Milwaukee 2, Wis. The indicator is placed above the faucet on the drum so that the exact quantity of liquid remaining in the drum can be told at a glance. It can be installed on all standard 50- and 30- gallon steel drums easily, by simply screwing the indicator into the drum faucet opening, then screwing the faucet into the opening on the indicator body.

Lift Truck

AN ALL-ELECTRIC lift truck known as the "Barrett PowerOx" is announced by Barrett-Cravens Company, Dept. I, 3255 W. 30th Street, Chicago, Ill. The unit has an electric drive and electric lift which enables any operator, even women, to handle loads of 4000 to 6000 lb. with comparative ease.



Electric lift truck

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Readers' Service as a convenience for executives. To obtain this literature, fill in the coupon, clip to your letterhead, and mail to FOOD INDUSTRIES.

Food Plant Equipment

Pumps 1
Taber Pump Co.—Bulletin No. S-146. 8-page illustrated brochure discussing the use of various types of pumps in different applications. Discusses basic principles of pump selection.

Stainless Steel 2
Allegheny Ludlum Steel Corp.—100-page handbook of stainless steel containing data on types of stainless and corrosion resistance against various materials. Discusses properties, products, available forms and sizes and fabrication methods. Contains general tables of bar weights, weights of sheets, weights of tubes, etc.

Equipment Lining 3
Industrial Lining Engineers, Inc.—4-page leaflet featuring the facilities and services offered by this company.

Gasoline-Driven Pump 4
Maryland Products Co.—A 4-page bulletin describing their gasoline-engine-driven centrifugal pumps.

Jar Mills 5
Abbe Engineering Co.—Catalog No. 63, 26 pages describing and illustrating a large line of jar mills and rolling machines which permit the processing of different batches of wet or dry materials.

Packaging Equipment 6
Packaging Industries.—A four-page leaflet describing wrapping, weighing and heat sealing equipment.

Electrical Equipment 7
Cook Electric Co.'s 20-page booklet covers this company's line of electrical relays.

Metal Fabrication 8
Hungerford Corp. has a 16-page pictorial booklet describing the metal fabrication services and facilities available from this company.

Piping 9
The Duriron Co., Inc.—Bulletin 704. 4-page leaflet containing information on Duriron and Durichlor acid-resisting flanged pipe and fittings. Sizes and dimensions of the pipe and various fittings are tabulated and a section of the bulletin is devoted to installation methods.

Compressors 10
Watson-Stillman Co.—Bulletin 370-C.—8-page booklet featuring the general purpose hydraulic compressors in capacities of 20 to 200 tons. Includes photographs of equipment together with a table of specifications.

Steam Cleaner 11
Homestead Valve Mfg. Co.—2-page leaflet featuring the Model JO Hypressure Jenny, a steam cleaner made by this company. It is used for cleaning machinery, parts, automobile engines and chassis, floors, walls, windows, etc.

Gas Alarm System 12
Davis Emergency Equipment Co., Inc.—Technical Bulletin No. 1116 E describes a method for detecting and giving audible notification of hazardous gas or vapor conditions sometimes present during industrial processing operations. This 8-page bulletin describes the various combinations possible and illustrates different parts of the equipment. Operating principles, together with installation diagrams are included.

Centrifugal Pumps 13
Ingersoll-Rand Co.—A 2-color, 16-page catalog No. GT-7062 describes and illustrates two stage centrifugal pumps for general use in packing plants, refineries and other food processing establishments. It is illustrated with cutaway views, types of drive, and typical installations. Also included are tables of performance, dimensions and pipe friction, and a typical pumping problem is worked out in detail.

Electronic Heating 14
Radio Receptor Co., Inc.—Bulletin 7005. 8-page booklet entitled "Electronic Heating and Sealing With the Thermatron" illustrates and describes the use of electronic generators for the preheating and sealing plastics, rubber, plywood and various other dielectric materials.

Dust Collector 15
American Foundry Equipment Co.—8-page booklet featuring the dust control equipment available from this company.

General Equipment 16
Seedburo Equipment Co.—1946 catalog includes over five hundred items on general equipment and supplies. In addition, one section is devoted exclusively to grain grading and grain sampling.

Thickeners and Clarifiers 17
Hardinge Co., Inc.—A 16-page bulletin No. 31-D describes and illustrates thickeners, clarifiers and agitators. The construction, the principles of operation and basic features are all included.

Electric Equipment 18
Allis-Chalmers Mfg. Co.—Bulletin C 6452.—16-page letter size handbook of electrical equipment used by a wide variety of industries. Describes classifications of electrical equipment ranging from a.c. and d.c. motors to electronic heaters. Also Booklet 25 D 6177 B containing 16 pages entitled "Buying Guide of Allis-Chalmers Equipment for the Process Industries."

Centrifugal Pumps 19
Warren Steam Pump Co., Inc.—Bulletin 241 describes and illustrates 4- and 6-stage, Type TM high-pressure centrifugal pumps.

Electric Motors 20
Century Electric Co.—Form 643. 8-page illustrated booklet featuring the slip ring induction polyphase motors from 1 to 350 hp., available from this company. Contains information on operating characteristics, and suggested applications.

Small Boiler 21
Kewanee Boiler Corp.—Catalog 99d describes and illustrates six junior sizes of portable return tubular Scotch marine boilers for high pressure steam.

Blowers 22
General Blower Co.—Booklet illustrates and describes this company's line of exhausters, fans, blowers and insulation blowing machines.

Lighting 23
A full-color folder entitled, "America's No. 1 Lighting Job," has been released by The Edwin F. Guth Company. It describes and illustrates the relighting of West Point, and contains valuable information on lighting and eyesight studies.

Fire Extinguishers 24
Walter Kidde & Co., Inc.—12-page booklet illustrating and describing the inspection and maintenance of fire extinguishers. Covers in detail the maintenance system required for this work. The different kinds of extinguishers used, their inspection, refilling and maintenance are included.

Filters 25
Drico Industrial Corp.—46-page booklet giving information on the use of filters in the purification of air, gas and liquids. It gives a good deal of general information on filtration, as well as giving data on the equipment manufactured by this company.

Pumps 26
Economy Pumps, Inc.—Bulletin D-246. 8-page bulletin illustrates and describes the Type SCV pump made by this company. Construction features are shown, together with tables of dimensions. Outstanding features are illustrated.

Screens 27
Robins Conveyors, Inc.—Bulletin 111-A. 12-page bulletin illustrating and describing the Eliptex screen manufactured by this company. Principle of operation is

Good until February, 1947

FOOD INDUSTRIES READERS' SERVICE

FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

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37	38	39	40	41	42	43	44	45	46	47	48	49					

NAME..... TITLE.....

FIRM OR AFFILIATION.....

ADDRESS.....

11-46

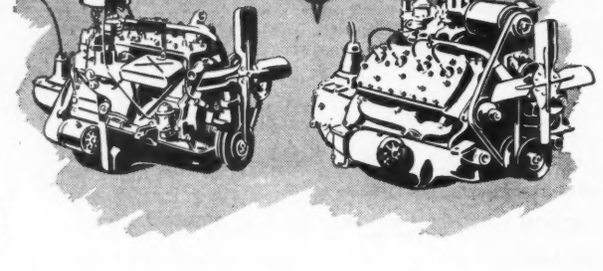
REGISTRATIONS *SHOW* IT—OPERATORS *KNOW* IT!

"FORD TRUCKS LAST LONGER!"

Ford Heavy Duty 1½-Ton, 158-inch wheelbase, with Two-Unit Van body by Boyertown Auto Body Works, Boyertown, Pa.

One big reason—

FORD ENGINES STAND UP!



Ford Truck engines—either the famous 100-H.P. V-8 or the extra-thrifty 90-H.P. Six—are world-famous for endurance in severe service. Here are some reasons why: They're of time-proved L-head type, quiet, simple, efficient—hardened valve seat inserts resist pounding and pitting—precision-set valves need no adjusting—valve springs are shot-peened and rust-proofed for long life—Ford alloy cast steel crankshafts are balanced and counterbalanced for enduring smoothness—Flightlight aluminum alloy 4-ring pistons maintain good compression, save oil. Full pressure lubrication, with positive, large-capacity oil pumps, plus effective crankcase ventilation, scientifically correct cooling and efficient oil- and air-filtering, all prolong Ford engine life.

Ford

There are more than fifty such long-life features throughout Ford Truck engines and chassis. NO OTHER TRUCKS BRING YOU ALL THESE IMPORTANT PLUS VALUES AT ANY PRICE. It is the extra worth which Ford alone offers that makes Ford Trucks Last Longer. This extra value tells you clearly why 7 out of 11 of all Ford Trucks registered since 1928 are still in service—why more than half of all Ford Trucks on the job are at least nine years old!

The best way to get a new Ford Truck is to get your order in. See your Ford Dealer now.

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

given, specifications of the equipment are shown, and the various components of the equipment are described. Applications for wet or dry screening are described. Includes diagrams with dimensions in tabular form.

Heat Exchangers **28**
Tenney Engineering, Inc. — Catalog CD-46. 20-page catalog illustrating and describing the cooling unit made by this company. Includes prices, coil selection tables, formulas for determining coil sizes, and other engineering data. Also contains a product storage load data section for various commodities usually placed in cold storage.

Refrigeration **29**
Kramer Trenton Co.—A 42-page Bulletin No. 15 which gives a comprehensive coverage of low-temperature refrigeration applications. It includes "rapid selection tables" to help select "low side" and "high side" equipment for freezer jobs most commonly encountered.

Motors and Converters **30**
Electric Specialty Co.—Catalog No. 46-1, 8 pages, two colors, describes "Rotating Electrical Equipment". Included are a-c, d-c and universal motors; dynamotors and converters; motor-generator sets and gas and diesel electric generating plants.

Vertical Motor **31**
Protected-type motors designed for close coupling to centrifugal pumps, agitators, atomizers and other types of machines are described in Bulletin SL-300-3 issued by Crocker-Wheeler Electric Mfg. Co., Division of Joshua Hendy Iron Works.

Plant Supplies

Paint **32**
Boder Scientific Co.—A leaflet describing corrosion-resistant "Tygon" paint.

Slime Prevention **33**
Wallace and Tiernan Products, Inc.—4-page leaflet featuring the use of chlorination for the removal and prevention of slime fouling on waterside surfaces.

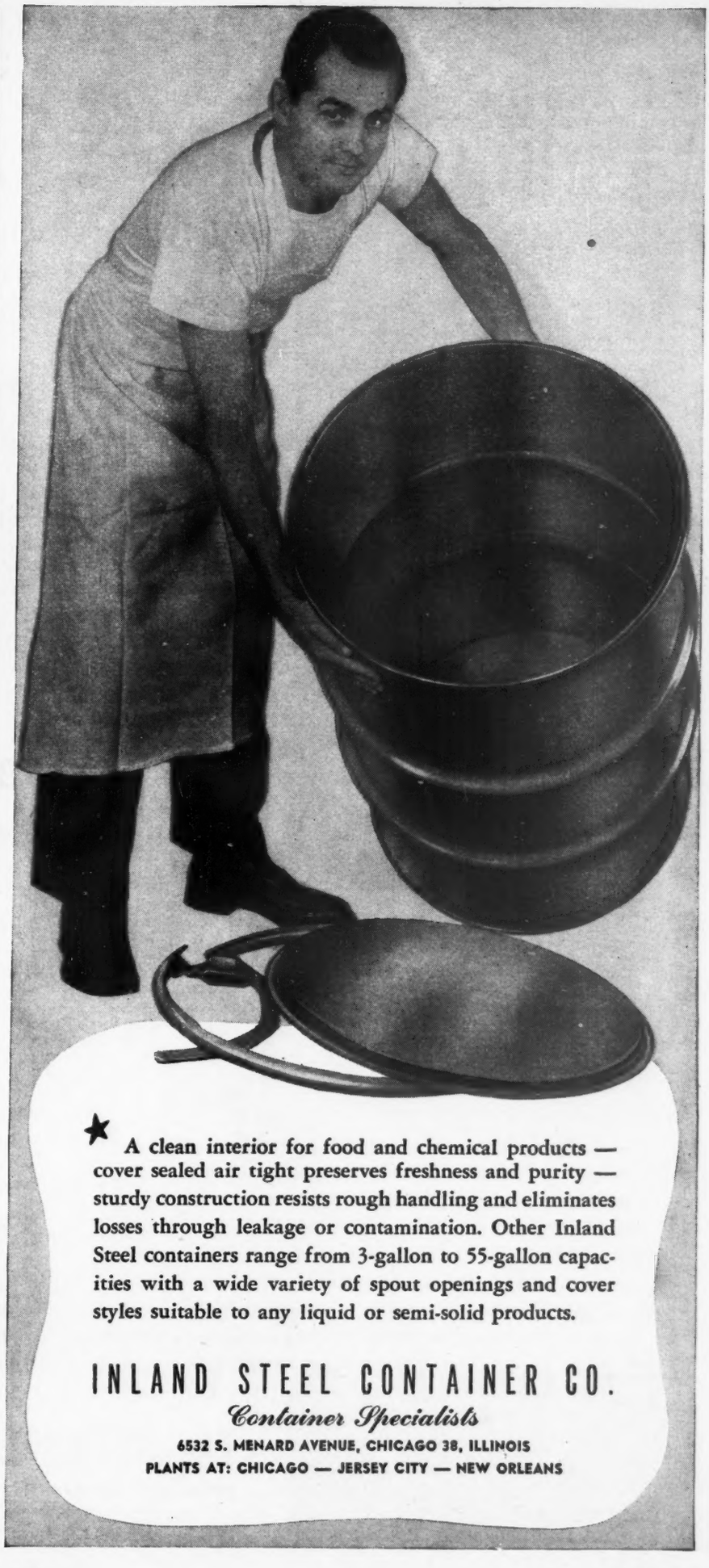
Lubrication Chart **34**
A simplified step-by-step lubrication chart D 182, for standard gear motors on rapid standard power belt conveyors, has just been issued by Rapid Standard Co. Inc.

Protective Coatings **35**
Organic protective coatings and their performance on electrolytic tinplates are given in a folder published by Watson-Standard Co. It outlines variables which affect properties and performance of electrolytic tinplates, and is complete with tables and charts of tests made to find the solution to this problem.

Cleaning Compound **36**
Wyandotte Chemicals Corp.—A 16-page leaflet entitled "Wyandotte Products for Canneries." It contains information on the use of the company's cleaning, peeling and germicidal products in food processing and canning plants.

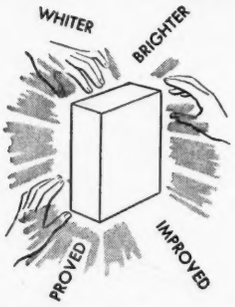
Insecticide Sprayer **37**
The Lofstrand Co.—A leaflet describing the hand operated insecticide sprayer made of stainless steel and brass parts and with hose, gaskets and washers made of special synthetic rubber to overcome difficulties usually found with petroleum base insectides.

Plastic Materials **38**
Bakelite Corporation.—36-page booklet G-11 entitled "The ABCs of Modern Plastics." Provides a brief outline of the origin, preparation, and uses of plastics. Subjects discussed are thermosetting and


★ A clean interior for food and chemical products — cover sealed air tight preserves freshness and purity — sturdy construction resists rough handling and eliminates losses through leakage or contamination. Other Inland Steel containers range from 3-gallon to 55-gallon capacities with a wide variety of spout openings and cover styles suitable to any liquid or semi-solid products.
INLAND STEEL CONTAINER CO.
Container Specialists
6532 S. MENARD AVENUE, CHICAGO 38, ILLINOIS
PLANTS AT: CHICAGO — JERSEY CITY — NEW ORLEANS

Right over there!

....MAYBE ONE OF THOSE TWO FAMOUS GARDNER-RICHARDSON FOLDING CARTONS IS JUST WHAT YOU ARE LOOKING FOR



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thermoplastic materials, molding and extrusion, all types of laminating, plywood molding and a number of other phases of the subject of plastics.

Vitamins 39
Eli Lilly & Co.—28-page brochure featuring the B-vitamins. Includes data on the synthesis of these materials and contains a glossary giving names and synonyms of the B-vitamins.

Rustproofing 40
Nox-Rust Chemical Corp.—24-page catalog illustrating and describing the different rust-proofing compounds and coatings available from this company, together with their principal applications.

Industrial Clothing 41
Archer Rubber Co.—A bulletin describing and illustrating its line of waterproof industrial work clothing.

Cheese Wrappers 42
Marathon Corp.—A four-page leaflet in color describing "Parakote" wrappers and pouches for packing cheeses.

Miscellaneous

Product Testing 43
Pittsburgh Testing Laboratory.—30-page brochure illustrating and describing in detail the services and facilities offered by this company in its district branches and laboratories throughout the U. S., Canada and England. These services include testing of materials, field inspection and testing and product performance testing in many industrial fields.

Scientific Consultants 44
"More Profits with Chemistry" is the title of a 20-page illustrated booklet from Truesdail Laboratories, Inc., describing many of the modern ways in which scientific services can be applied profitably in food processing. Printed in two colors, the booklet shows new chemical engineering equipment and technics.

Industrial Medicine 45
American Mutual Liability Insurance Co.—8-page folder featuring plans for an industrial medical department. Important details are discussed and a floor plan of a proposed medical department is given.

Consulting Service 46
Container Testing Laboratories, Inc.—A report which describes its "package consulting service."

Advertising 47
Magazines, Inc.—6-page advertising brochure designed to assist in solving the problems incident to building a catalog, getting out flyers, or carrying on a publicity campaign. It is entitled "Your Catalog and Publicity Problems."

Visual Study Curve 48
American Optical Co.—A brochure entitled "Industrial Visual Efficiency; A Management Opportunity" describes a vision testing program developed and designed to promote industrial efficiency by testing employees who need eye examinations and correction.

Paper Bag Storage 49
Bemis Bro. Bag Co. has issued a very interesting booklet on the care of paper bags. It is entitled, "Important Facts for the Man in Charge of Paper Bag storage." It gives valuable data regarding the proper methods to follow in caring for paper bags in storage and how to restore moisture to paper bags after they have dried out. The story is largely told in pictures, and it is well done indeed.

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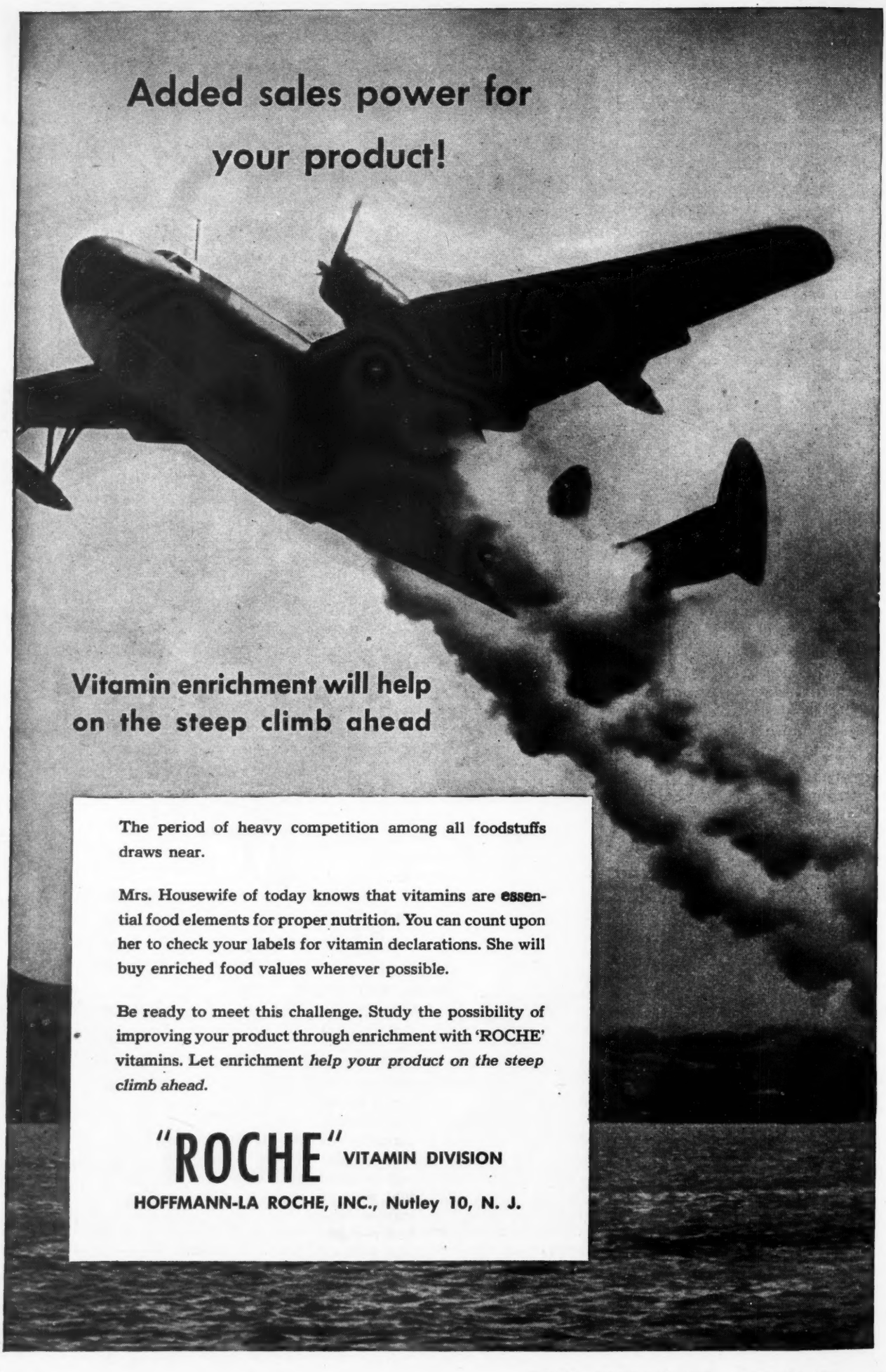

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

SUGARS

Clarifying Sugar Juices

SUGAR juices, from both cane and beets, are subject to inversions at elevated temperature in the acid state. To prevent this hydrolysis the pH of the juice is raised by addition of lime, before boiling to precipitate colloidal matters. In contrast to this procedure, a process recently patented proposes to lower the pH and further the precipitation of dissolved or suspended colloids by mixing with the raw juice a hydrogen carbonaceous zeolite. The action is threefold: (1) The metals in the juice, such as potassium, sodium, calcium or magnesium, are replaced by hydrogen from the zeolite; (2) the acidity is increased to the point where the colloids are precipitated; and (3) colored matter is absorbed by the carbon of the carbonaceous zeolite. This treatment, however, results in a sludge which is difficult to filter. A special apparatus keeps the sludge in constant agitation and circulation, causing precipitation to take place upon previously formed particles. In this manner it is possible to obtain larger and denser flocculation.

Digest from U. S. Patent 2,402,960, issued July 2, 1946, on an application filed July 22, 1942, to H. B. Gustafson and L. A. Paley, and assigned to Infilco Incorporated, Chicago, Ill.

ASSAY METHODS

Determining Volatile Fatty Acids in Cheese

VOLATILE fatty acids in cheese can now be determined by a short, comparatively rapid method, based on the distillation of two acid solutions. This method requires not more than four hours and compares favorably with the much longer method of Hiscox, Harrison and Wolf.

A 10 g. sample of cheese is ground in a mortar with warm 10 percent phosphoric acid. The acid-cheese mixture is extracted with ether and the volatile fatty acids removed from the ether with dilute alkali. The alkali rinses are heated to drive off the ether, then acidified, refluxed three to five minutes to remove CO_2 and distilled in the presence of magnesium sulphate until crystallization occurs. In the meantime, 250 ml. of distilled water are added to the residual material, left after the ether extraction, and the solution distilled until 280 ml. of distillate are collected. Both distillations are filtered through the same filter paper. The condenser and filter paper are washed with alcohol. The sum of the titrations of the two distillations plus that of the alcohol rinse represents the total volatile acids of the cheese.

Digest from "A Simplified Extraction-Distillation Method for the Determination of the Volatile Fatty Acids of Cheese," by K. L. Smiley, F. V. Kosikowsky and A. C. Dahlberg, *Journal of Dairy Science*, vol. 29, 307-315, May, 1946.

FERMENTATION

Edible Yeasts Produced From Sulphite Liquors

EDIBLE YEASTS were produced on a commercial scale from sulphite liquors, by a continuous process, in Germany during the war. Using waste liquors, derived from beech wood in the preparation of cellulose, and *Candida arborea*, instead of *Torula utilis*, as the fermenting organism, a plant capacity of 6,000 to 7,000 metric tons per year is said to exist.

The liquor was aerated for 8 hours at 175 to 195 deg. F. in large wooden vats. Calcium hydroxide was then added to raise the pH to 4.7-4.8, and as nutrients, KCl and superphosphates were added. The liquor was allowed to stand for a minimum of 12 hours, during which time $CaSO_4$ was precipitated. It was then cooled to 105 to 120 deg. F. by passing through a spiral plate cooler, and run into a fermentation vat having a capacity of 50,000 gal. To start the fermentation, 1,000 to 2,000 lb. of pressed yeast was added to 5,000 gal. of wort. Aeration was started and when the yeast content had reached 8 percent the continuous process was started, 1,250 gal. being added and removed hourly. The fermentation was run continuously for several months.

Wort from the fermentation tank was passed through horizontal centrifuges, washed two or three times, passed through a rotary filter unit, an autolysing tank, and dried over steam heated rollers. The good quality yeast was used for human consumption and the poorer grade was mixed with hay and compressed into bricks for feeding to army horses.

Digest from "Fodder Yeast Plants, I. G. Farbenindustrie, Wolfen," by H. J. Bunker, C.I.O.S. Report, Item No. 22.

MICROBIOLOGY

Toxic Organisms In Soil

SOIL samples collected from 238 places, and dusts from 45 places, were tested for the presence of *Clostridium botulinum* organisms by incubation in beef-heart, peptic-digest broth for 10 days, followed by feeding two mg. of centrifuged broth to a guinea pig. Death of the animal within four days suggested presence of the organisms, which were then typed by toxin-anti-toxin tests.

Of the 283 samples, 33 or 11.7 percent were toxic, 26 being of type A, five of type B, and two were mixed. Sixty of the soil samples were of virgin soil that, so far as could be learned, had never been

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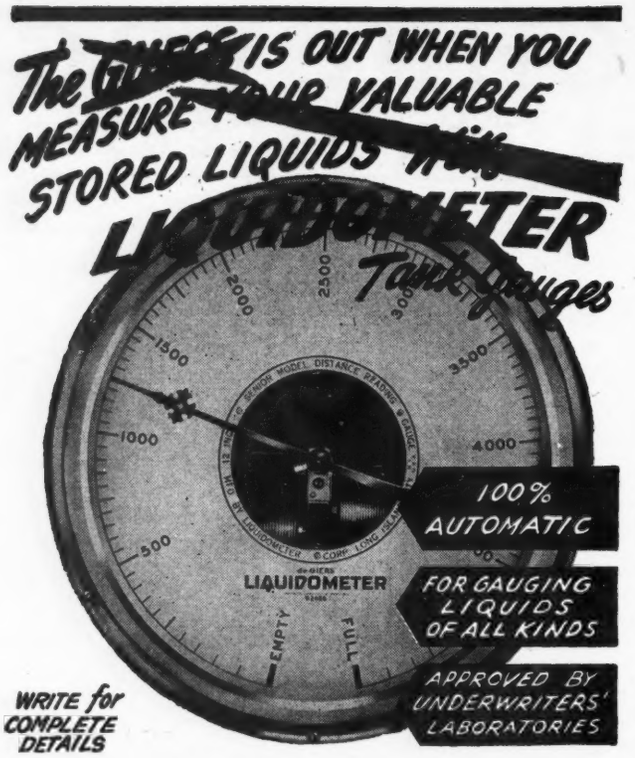

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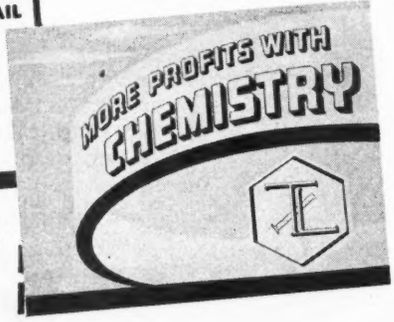

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SPECIAL FACILITIES FOR FOODS

cultivated, and 3 out of the 60 or 5 percent were toxic samples.

Of the 178 samples of cultivated soils, 26 or 14.6 percent were toxic. The pH values of the soils ranged from 5.4 to over 8.0 with no definite variation in toxicity over the range. The greatest percentage of toxic cultivated soils was obtained from ground bearing crops of string beans. Corn lands were next. From 45 samples of barn dusts, four toxic cultures were obtained.

The results of the study indicate a rather wide distribution of *Clostridium botulinum* in central New York, chiefly of Type A. Only types A and B were found. The high incidence of the organism in cultivated soils is at variance with some other findings, such as those of Meyer who postulated the organism as a natural inhabitant of virgin soils, carried by wind or other means to cultivated fields. The wide pH range of soils in which the organism was found indicates that a crop cannot be considered safe from contamination because of the pH of the soil in which it is grown.

Digest from "Prevalence of *Clostridium Botulinum* in Soils of Central New York State," by E. Parry, *Food Research*, vol. 11, 203-209, May-June, 1946.

DEHYDRATION

Dehydrated Juices

A METHOD of dehydrating fruits and vegetables and their juices in a cyclone type drier without sticking, has been invented.

According to the patent, this is accomplished by mixing proteins with the solid or liquid to be dehydrated, the amounts of proteins to be equivalent to not less than 25 percent of the solids content of the dehydrated product.

Digest from U. S. Patent 2,400,460, issued May 14, 1946, on an application dated October 1, 1942, to J. M. Hall, and assigned to Drying & Concentrating Company, a corporation of Delaware.

Dehydrated Stock Food From Cull Potatoes

CULL potatoes can be dehydrated and converted into a marketable stock food, at a cost which meets all competition, by the use of a newly devised method.

Whole cull potatoes are passed through a hammer mill, wherein the water is freed. By means of a continuous mechanical press the major part of the water is removed. The press cake is fed to a direct

(*Turn to page* 198)

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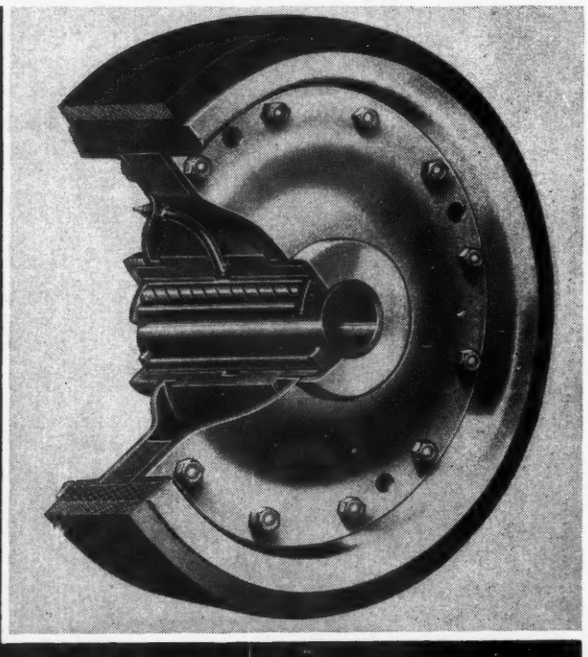

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heat rotary drier which produces a dry, granular material that makes an excellent stock food without further processing. Analysis: 60 to 65 percent starch, 7 to 9 percent protein and 3 to 5 percent ash. The process is described and illustrated by a flow sheet.

Digest from "A New Process For the Dehydration of Cull Potatoes," by A. C. Burr and A. M. Cooley, given before the Division of Agricultural and Food Chemistry, American Chemical Society, Chicago, Ill., Sept. 12, 1946.

Low Temperature Drying

A NEW apparatus for dehydrating liquids, in which a large amount of air at atmospheric temperature is mixed with a relatively small quantity of heated air to form the dehydrating medium is the subject of a recent patent.

With this apparatus excellent results may be obtained, it is claimed, by the use of air at a temperature of from 220 to 225 deg. F. It has the further advantages of: Dehydrating liquids at pressures at which they may otherwise be overheated and; subjecting the dried particles to the heat for only a few minutes.

Digest from U. S. Patent 2,400,458, issued May 14, 1946, on an application dated Feb. 7, 1940, to J. M. Hall, and assigned to Drying & Concentrating Co., a corporation of Delaware.

Freeze-Drying Peas

PEAS, preserved by freeze-drying, compare favorably in color and flavor with those preserved by ordinary freezing methods.

Freeze-drying technic was compared with ordinary freezing methods of preservation on 6 varieties of green peas. The peas were scalded, cooled and divided into two portions. One was frozen at 5 deg. F. in the freeze-drying equipment, dried to between 2 and 5 percent moisture, packed in sealed cans and stored at 59 deg. F. Some samples were stored in nitrogen. For freezing, the peas were packed in tins, frozen and stored at -4 deg. F.

After storage for 6 and 14 months, samples were compared for culinary quality. The freeze-dried peas were soaked in cold water for 15 min. and cooked for 5 to 20 min. as required. Frozen peas were placed in boiling water and cooked 5 to 20 min.

Both methods of preservation gave good results. There was a slow deterioration in quality in freeze-dried peas during storage in air, but even after a year they closely resembled those preserved

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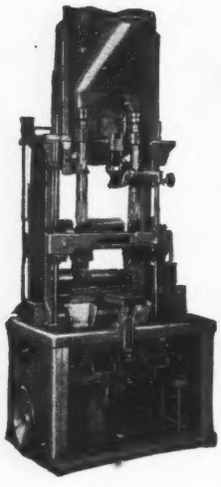

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by freezing. Packing in nitrogen retarted the deterioration. Ascorbic acid loss was slightly greater during preparation and storage of freeze-dried peas than with frozen ones.

Digest from "The Quality of Green Peas Dried in the Frozen State," by J. Barker, R. Gane and L. W. Mapson, *Food Manufacture*, 345-348, August, 1946.

DAIRY

Powdered Cream Mix

A NEW spray dried cream-mix has been developed that, when whipped by aeration, gives a product similar to that obtained from fresh sweet cream. It contains approximately 30 percent butterfat, 7.5 to 8 percent M.S.N.F. 5 percent sugar and 0.2 to 0.3 percent whipping agent.

The cream-mix may be dried with or without sugar. Sugar can be mechanically mixed with the powdered cream, or it can be added to the water at the time of reconstitution. Keeping quality can be improved by packing in an inert gas, and by the addition of certain antioxidants, such as NDGA, gallic acid or sodium Arbo ascorbate, before drying.

Composition of the dried cream-mix, on an average, was 68.8 percent butterfat, 99.29 percent total solids, 2.8 ppm. iron and 1.02 ppm. copper.

Digest from "The Manufacture of Powdered Cream-Mix for Whipping by Aeration," by H. Pyenson and P. H. Tracy, *Journal of Dairy Science*, 511, August, 1946.

Sterilization of Milk

MILK, and other liquiform food products, sterilized by a process which does not result in the alteration of flavor or stability of the product treated is the subject of an invention recently patented.

According to the patent, the liquid food material is forced, under a pressure of at least 2,500 lb. per sq. in., through a constriction and discharged as a fine mist directly into a sterilizing zone. The sterilizing zone is maintained at a pressure less than 100 lb. per sq. in. and contains steam at a temperature and pressure sufficient to produce a temperature in excess of 250 deg. F. Complete sterilization of the mist is said to be effected within a few seconds, when the microorganisms contained in the particles of mist are subjected to disruptive expansion and an abrupt rise in temperature.

The food material, after being

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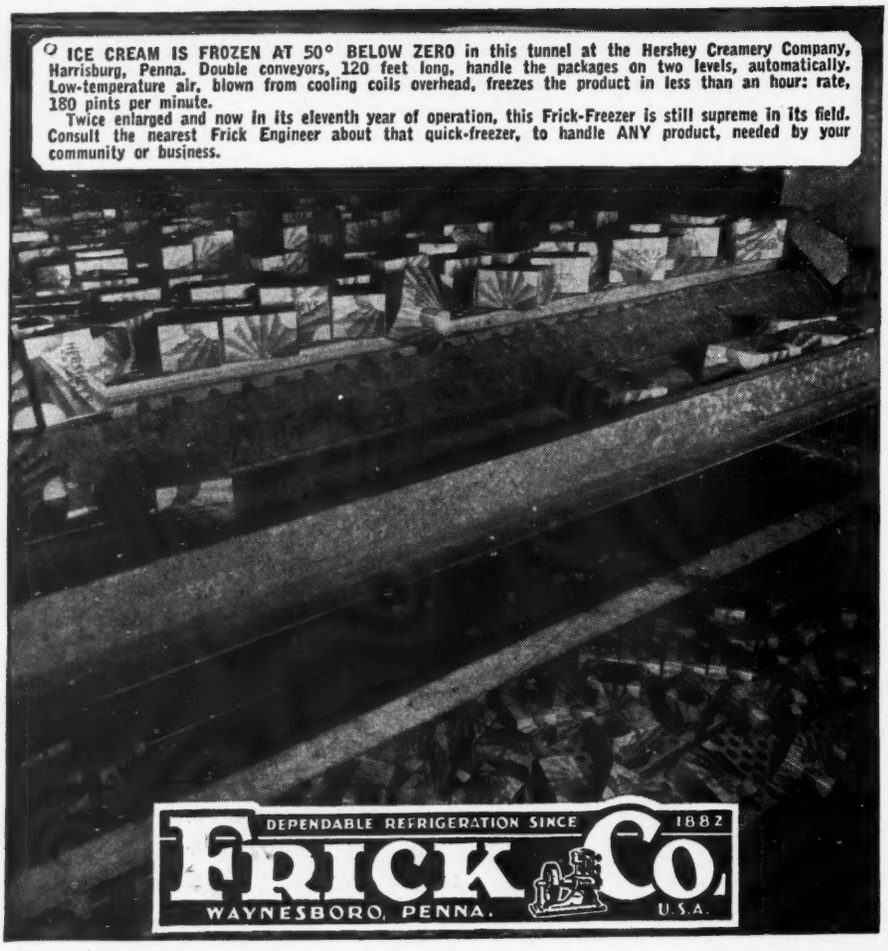
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completely sterilized, and while in the mist-like state, is discharged into a vacuum pan for liquification, and where desired, for concentration.

Digest from U. S. Patent 2,401,077, issued May 28, 1946, on an application dated Jan. 11, 1943, to E. C. Johnston, Milwaukee, Wis., and assigned to Robt. A. Johnston Co., Milwaukee, Wis.

CANNING

Canning Soybeans

A PROCESS for canning soybeans, whereby the beans will remain in an edible, palatable condition for long periods of time is the subject of a recent patent. This is accomplished by carrying out the cooking operation in an aqueous medium containing sufficient acidic material to produce a pH value from 5.65 to not more than 6.

Digest from U. S. Patent 2,400,123, issued May 14, 1946, on an application dated August 13, 1941, to A. A. Levinson, B. T. Malter and P. L. Julian, and assigned to The Glidden Company, Cleveland, Ohio.

SANITATION

Carbon Removes Odors

ACTIVE carbon treatment is the most efficient method at present available for removing odors from water. Several hours contact with the carbon should be allowed, after which it is removed on sand filters. It may also be added with coagulants such as aluminum sulphate. It is then removed along with the alum in the settling tanks. Since carbon will remove chlorine from water, carbon treated water must be subsequently chlorinated, or blended with water previously chlorinated. When palatability is highly important, as in bottled mineral waters, carbon treatment is particularly desirable.

In Chicago, in 1927, carbon treatment was used to remove chlorphenol odors from the water supply and a similar treatment was instituted in South Pittsburgh in 1930 at Bay City, Mich., and Hamburg, N. Y. By injecting carbon into raw water, into water going to settling basins, and into settled water ahead of filters, odor removal is accomplished with as little as 28 lb. of active carbon per million gallons.

Active carbon coated with silver effectively destroys bacteria and algae. Small quantities of mineral or vegetable oils—not to exceed 1 g. per cu. ft. can be removed by filtering through active carbon, and

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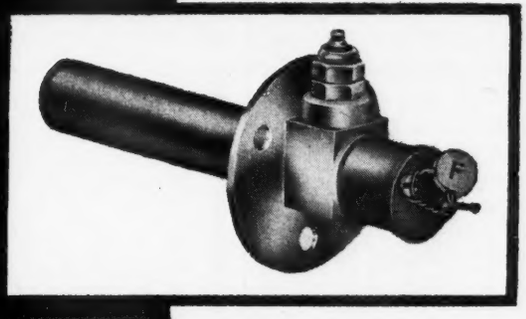
Illustration shows a THERMOSWITCH Control with tamper proof cap and wire and lead seal. Combining this feature with the completely enclosed electrical assembly of the THERMOSWITCH Control insures all-around protection from unauthorized tampering with the control unit.



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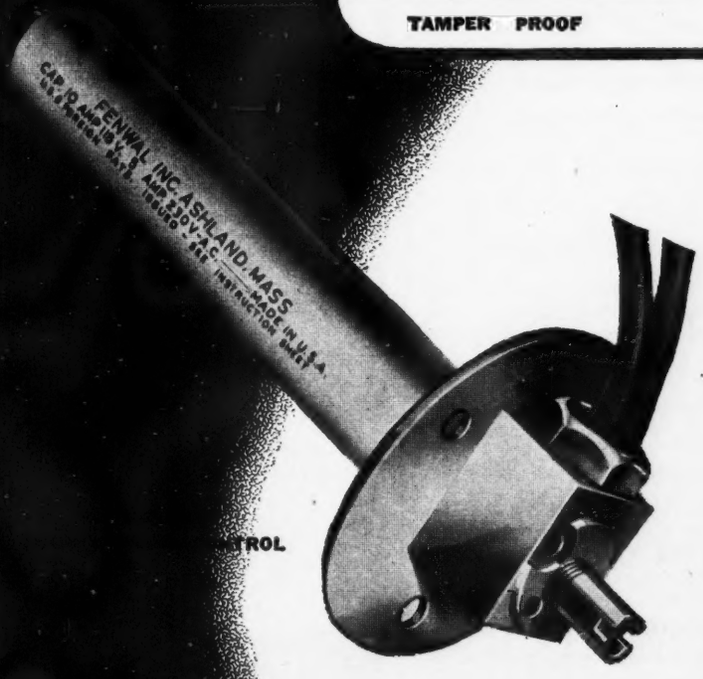
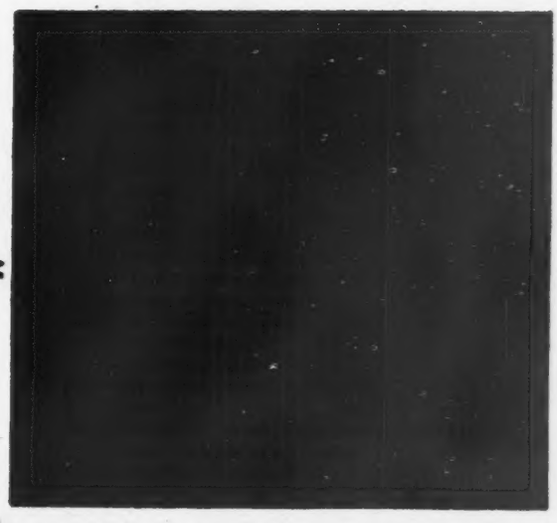


TROL



* #8 of "14 Facts in Fenwal's Favor"

Fenwal

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19 PLEASANT STREET

ASHLAND MASSACHUSETTS

Thermotechnics for Complete Temperature Regulation

larger quantities, by a preliminary filtration through coke. Carbon impregnated with aluminum sulphate will remove fluorides from water.

Pyrogens can also be removed from distilled water by active carbon filtration, as well as from solutions prepared from the water. If carbon is added to a distilled water receiver, and the still is thoroughly cleaned regularly, a constant supply of pyrogen-free water is assured.

Digest from "Removal of Taints from Water," by E. Howard and E. C. R. Spooner, *Chemistry and Industry*, 186-188, May 11, 1946.

MISCELLANEOUS

Citric Acid Process

A FUNGAL organism, *Aspergillus wentii*, is capable of converting, under suitable growing and fermenting conditions, all kinds of carbohydrates (mono-, disaccharides, molasses, and even starches) into citric acid to the substantial exclusion of undesired by-products. The patented process comprises a growth phase and a fermentation phase. In the former, sporulation of the fungus is retarted by keeping the iron concentration to a minimum and the zinc concentration to a maximum, while in the latter, care must be taken to neutralize excess acidity without raising the pH above 3.0.

Digest from U. S. Patent 2,400,143, issued May 14, 1946, on an application dated May 8, 1943, to S. A. Waksman, and assigned to Merck & Co., Rahway, N. J.

Detergency Studies

STUDIES of the detergency qualities of washing powders were made by washing raw milk films from glass surfaces by a mechanical apparatus devised for the experiments, and measuring the result in terms of light transmission by use of a Cenco-Sheard spectrophotelometer. Detergency varied with the material and the washing procedure used. Solutions prepared from near-neutral wetting agent and metaphosphate mixtures gave the highest detergency values. Next in order were a slightly alkaline wetting agent detergent, an alkaline salt containing a wetting agent, alkaline salts containing metaphosphate, and an acid detergent which gave the lowest and an entirely inadequate detergency.

Prerinsing demonstrated a de-

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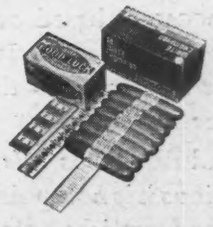
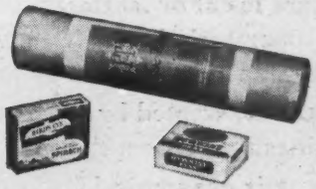


FOR MEAT PRODUCTS

FOR DRIED FOODS

FOR PRE-MIXED FOODS



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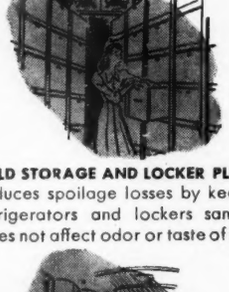
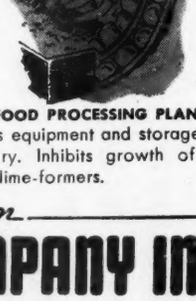


COLD STORAGE AND LOCKER PLANTS
Reduces spoilage losses by keeping refrigerators and lockers sanitary. Does not affect odor or taste of food.

FISHERIES AND FISH PACKERS
For sanitizing storage areas of fishing boats and canneries, filet machines, shrimp de-veiners, etc.



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pressive action with both hard and soft water with all detergents except the acid. Better detergency was secured with soft than with hard water. Highly improved detergency was attained when prerinsing with water containing metaphosphate in slight excess of that required for sequestration of water hardness.

After-rinsing demonstrated improved detergency with alkaline detergents when hard and soft water were used at 150 deg. F. Depressed detergency occurred with acid, wetting agent and wetting agent plus metaphosphate detergents. Soft water for a final rinse gave better results than hard water.

When the wetting agent-metaphosphate detergent was used and the final rinse contained 0.10 and 0.15 percent metaphosphate in water containing 300 to 320 p.p.m. hardness, high light-transmission readings were maintained throughout repeated washing trials. Highest and practically complete detergency as measured by light transmission occurred when 0.10 and 0.15 percent wetting agent-metaphosphate detergents were used in the final rinse.

Digest from "Measuring Detergency Functions as Affected by Various Detergents and Procedures Against Milk Films by Application of a Mechanical Washing Apparatus," by J. M. Jensen, *Journal of Dairy Science*, vol. 29, 453-463, July, 1946.

Vegetable Sausage From Wood Wastes

VEGETABLE SAUSAGE, made from wood wastes, was one of the many yeast products produced by the Germans to supplement their wartime diet. They were used to enrich meat and spaghetti sauces, vegetable dishes, etc.

The vegetable sausage, said to resemble liverwurst in odor and taste, contained 80 percent dried yeast, 10 percent soya and 10 percent flavoring. Up to 20 percent wood-sugar yeast was added to canned peas without harming the taste. Used on salads and vegetables, yeast powder was said to have a flavor like parmesan cheese. It was used as a substitute for meat extracts.

Although waste-product yeast does not have the high food value of brewers' yeast it contains over 50 percent high-quality protein, and more than 4,500 calories per kg. It is extremely rich in vitamin B.

Digest from "OTS-310," by F. Skoog, Office of Technical Services, Department of Commerce, July 30, 1946.

BOOKS

Frozen Food Index

LITERATURE SEARCH ON THE PRESERVATION OF FOOD BY FREEZING. By B. H. Weil and Frances Sterne. Published by the State Engineering Experiment Station, Georgia School of Technology, Atlanta, Ga., as Special Report 23, 1946. 5½x8½ in.; 407 pages; paper. Price $4.

This index offers a bibliography of most of the literature on quick freezing of fruits, vegetables, juices, meat, poultry, seafoods, fish and precooked foods. More than 2,000 articles are abstracted.

Advances in Biochemistry

ANNUAL REVIEW OF BIOCHEMISTRY, Vol. XV. Edited by J. Murray Luck. Published by Annual Reviews, Inc., Stanford University P. O., Calif. 1946. 6¼x9 in.; 687 pages; cloth. Price, $5

Research food chemists will find this volume following in the well chosen path of its predecessors. Of particular interest are the reviews on the chemistry and metabolism of carbohydrates, lipids, and amino acids and proteins, as well as those on nutrition, water and fat soluble vitamins, and some of the enzymatic reactions. Although the volume appears annually, the subjects of the reviews differ from year to year. Accordingly the authors, all leaders in their fields, have followed the custom of reviewing the important work, which has appeared since the subject last appeared on the contents page. The book is thus, to some extent, a collection of well condensed and well presented monographs on active fields of research.

Tax Savings

HOW TO REDUCE PAYROLL TAXES UNDER MERIT RATING. Published by Research Institute of America, Inc., 292 Madison Ave., New York, N. Y., 1946. 8½x10 in.; 48 pages; paper. Price, $2.00—in quantities of 4 to 24, $1.00 each.

With 43 states having already adopted merit ratings, payroll tax savings have become an important factor in industrial economics. By these ratings, the benefits drawn from the state by an individual are reflected against his former employer, and thus affect the employers payroll tax. The fewer the benefits, the lower the tax.

In no industry do these savings possibilities loom larger than in food processing. With so many food plants still varying their employee numbers between seasonal peaks and valleys, the stabilized payroll appears to be still far off. But the indirect penalties presented by the merit rating system should speed the leveling of their operations.

This monograph provides tables showing disqualification on rules, rate formulas for states using reservations, benefit ratios and benefit wage ratios, an analysis of the compensable separations and tax credit systems. In addition, there is a section on tax saving recommendations covering methods of computing voluntary contributions and methods of appealing improperly computed rates.

Measuring Quality

STATISTICAL QUALITY CONTROL. By Eugene L. Grant. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1946. 6¼x9¼ in.; 563 pages; cloth. Price $5.

Measured quality of manufactured product is always subject to a certain amount of variation as a result of chance. Some stable "system of chance causes" is inherent in any particular scheme of production and inspection. Variation within this stable pattern is inevitable. The reason for variation outside this stable pattern may be discovered and corrected.

This quotation, taken from the first paragraph of the book, briefly states both the subject matter of the book and the point of view that engineers, production men and inspectors must adopt before statistical quality control can rise to its highest degree of usefulness, particularly in food processing.

The book is described as a working manual. It attempts to explain the simple, but powerful technics that can be used widely in industry to improve product quality and reduce costs. Those who have read the articles appearing in the June, August and September issues of FOOD INDUSTRIES know how well these controls can be applied in food production. Fully illustrated, the book covers every aspect in great detail.

The author, professor of economics engineering at Stanford University, has developed his thesis through a course on the subject, during the past 17 years. More

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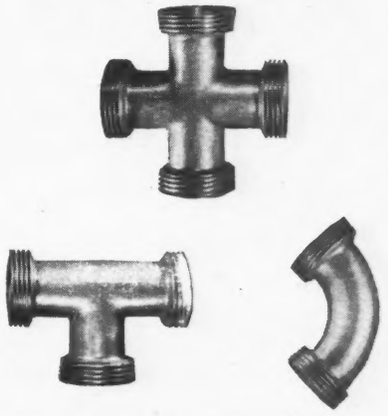

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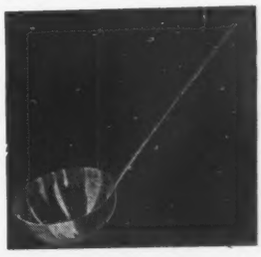

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particularly, however, the book has developed from short full-time courses given for key personnel of West Coast war industries in the summer of 1942 and thereafter.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue.

FRUITS: PRODUCTION AND UTILIZATION 1934-45. Bureau of Agricultural Economics, Washington 25, D. C.

SANITATION OF FROZEN FOODS. By James A. Berry. Bureau of Agricultural and Industrial Chemistry, AIC-120, Washington 25, D. C.

WHOLESALE BAKING INDUSTRY. Part II: Report on Cost, Prices and Profits (Summary only). Federal Trade Commission, August 7, 1946. (Part I "WASTE IN THE DISTRIBUTION OF BREAD," was released April 22, 1946.) Washington 25, D. C.

TRADE PRACTICE RULES FOR THE WHOLESALE CONFECTIONERY INDUSTRY (Philadelphia Trade Area). Federal Trade Commission, As Promulgated July 30, 1946. Washington 25, D. C.

FRUIT AND VEGETABLE CANNING INDUSTRIES 1934-1945. Bureau of Foreign and Domestic Commerce, Production and Wholesale Distribution Industrial Series No. 15 (Revised to July 15, 1945). Price 40 cents.

ANIMAL AND VEGETABLE FATS AND OILS, 1941-1945. Factory Production, Consumption, and Stocks. Bureau of the Census, Facts For Industry Series M17-7-05, Washington 25, D. C.

REPORT OF STUDIES ON UNIFORMITY OF QUALITY OF BEET SUGARS. By C. A. Fort and others. Bureau of Agricultural and Industrial Chemistry, AIC-123. Mimeographed.

FEED CONSUMPTION AND THE PRODUCTION OF PORK AND LARD. By L. Jay Atkinson and John W. Klein. Department of Agriculture Technical Bulletin No. 917. Price 10 cents.

FISHERY STATISTICS OF THE UNITED STATES 1942. By A. W. Anderson and E. A. Power. Fish and Wildlife Service, Statistical Digest No 11. Price 60 cents.

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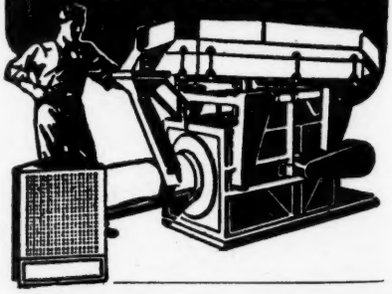

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PATENTS

BAKING

Baked Pastry Shells Made to Enclose Mass of Frozen Confection by Superposing One Shell on Another, Line of Meeting Sealed With Strip of Dough, Product Frozen and Kept Frozen Preparatory to Submersion in Deep Hot Fat to Cook Strip of Dough and Brown Outer Surfaces of Shells Without Melting Confection Center—Richard P. Jetschmann, Milford, Conn. No. 2,404,177. July 16, 1946.

Dough for Pie Covers Sheeted and Perforated by Mechanical Means—John MacManus, Yonkers, N. Y., to Cushman's Sons Inc., New York, N. Y. No. 2,405,661. Aug. 13, 1946.

Dough in Loaf Units Twisted and Panned Mechanically—John Buechek, Kokomo. Ind. No. 2,405,684. Aug. 13, 1946.

Dough Mechanically Shaped into Pie or Similar Forms—Wendall M. Fletcher, Portland, Me. No. 2,405,781. Aug. 13, 1946.

Pie Filling Made to Consist of Gelatinized Starch, Sucrose, Starch Conversion Sirup Solids, Water and Flavoring—Ben F. Buchanan, Leonia, N. J., and Robert L. Lloyd, Laurelton, N. Y., to American Maize-Products Co. No. 2,406,585. Aug. 27, 1946.

ENGINEERING

Doughnuts Formed in Manually Operated, Low Production Mechanical Unit—Peter S. Premas, Chicago, Ill. No. 2,405,903. Aug. 13, 1946.

Food Materials, Such as Cabbage for Kraut, Mechanically Split and Sliced in Continuous Consecutive Operations — Peter F. Quinn, Racine, Wis. No. 2,406,-107. Aug. 20, 1946.

Foods Rapidly Dehydrated in Closed System Operating Under Sub-Atmospheric Pressure and at Temperature Below 0 Deg. C.—Norman V. Hayes and William B. Humes, Boston, Mass., to National Research Corp. No. 2,406,682. Aug. 27, 1946.

Frozen, Organic, Water-Containing Material Dehydrated In Closed System —Kenneth C. D. Hickman, Rochester, N. Y., to Distillation Products, Inc. No. 2,402,401. June 18, 1946.

Fruit Graded by Mechanical Means—McSherry Lupton, Winchester, Va. No. 2,406,842. Sept. 3, 1946.

Fruit Pitted by Mechanical Means Equipped With Plunger and Coring Knives—George W. Ashlock, Jr., Oakland, Calif. No. 2,407,126. Sept. 3, 1946.

Liquid Constituents of Beverages Mechanically Mixed in Rotatable Cylinder Fitted With Feed Inlets at One End Preliminary to Continuous Filling Into Marketing Containers—Robert J. Stewart to Crown Cork and Seal Co., Inc., Baltimore, Md. No. 2,408,107. Sept. 24, 1946.

Peanuts Chocolate Coated in Machine Equipped with Vibrator Feeder to Produce Individual Confection—Frank Petrovic, to E. J. Brach & Sons, Chicago, Ill. No. 2,406,437. Aug. 27, 1946.

FATS AND OILS

Butter Concentrates Made by Extracting Butter With Monohydroxy Alcohol, Hydrocarbons and Chlorinated Hydrocarbons, Aliphatic Ketones and Aliphatic Esters Respectively—Loran O. Buxton, Belleville, N. J., to National Oil Products Co., Harrison, N. J. Nos. 2,404,034; 2,404,035; 2,404,036; and 2,404,037. July 16, 1946.

Glycerol Made by Hydrolizing Carbohydrates in Wheat Mash to Maltose, Treating With About 0.5 Percent Hydrochloric Acid and Boiling With Sulfite Waste Liquor Preliminary to Separating of Precipitate and Subjecting Liquor to Glycerol Fermentation—James S. Wallerstein, New York, N. Y., Eduard Farber, New Haven, Conn., and Victor Dayton, New York, N. Y., to the Overly Bio-Chemical Research Foundation, Inc., New York. No. 2,400,-859. May 21, 1946.

FRUITS AND VEGETABLES

Onions and Garlic with 3 Percent Moisture Content Formed Into Bricks with an Increase in Moisture Content of About 0.2 to 0.3 Percent—Martha W. Miller, to Basic Vegetable Products Co., Vacaville, Calif. No. 2,406,431. Aug. 27, 1946.

Sweet Potatoes Cooked, Extruded and Toasted at About 270 Deg. F. Until Crisp — Lamar Mims Ware, Hubert Harris, and William Aubra Johnson, Auburn, Ala., to Alabama Polytechnic Institute, Auburn, Ala. No. 2,401,392. June 4, 1946.

STARCH AND SUGAR

Sugars Containing 2 to 6 Carbon Atoms Treated With 2 to 3 Carbon Atom Glycol and Dihydric Inter-ethers With not More than 6 Carbon Atoms In Presence of Strong Mineral Acid Catalyst to Make Glycol Glucosides and Derivatives With Emulsifying Properties—William C. Griffin, Newport, Del., to Atlas Powder Co., Wilmington, Del. Nos. 2,407,001, 2,407,-002, and 2,407,003. Sept. 3, 1946.

Starch Treated With Melamine-Formaldehyde Condensation Product to Make Molding Composition—Donald W. Hansen to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,408,065. Sept. 24, 1946.

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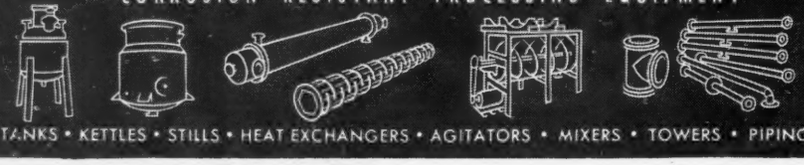


TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

How Foods Spoil

Continued from page 77

Many cases of poisoning have resulted from the more toxic chemicals, for example cyanide poisoning from silver polish, arsenic and lead poisoning from fruit sprays, and fluoride poisoning from chemicals used in pest control. One aspect of this problem which is perhaps more important to the food technologist is spoilage arising from contamination by fumigants or disinfectants. A case came to our attention recently where a preservative in a glue used on a cap liner decomposed with the formation of phenol, which imparted an undesirable taste and odor to pickled cucumbers and related products. Recently an importer brought us samples of imported whiskey, the bottles of which possessed a chemical odor, rendering the product unsalable. Chemical examination indicated the contaminant to be cresol, which had been splashed on the outside of the cartons by a careless ship attendant who, in the interest of good sanitation, mopped the floors with a disinfectant solution. Despite the fact that the contents of the bottles were unimpaired, the entire shipment had to be returned because the cresol odor could not be removed without damage to the labels and tax stamps. The material could of course be rebottled, but tax considerations made this prohibitive.

Absorption of Odors

The absorption of undesirable odors must be guarded against by the food technologist. Fats are particularly sensitive. Butter absorbs refrigerator odors. Recently a shipment of frozen eggs packed in crates was found to taste of fuel oil. These eggs had been stored in the hold of a ship near the fuel tanks and the contaminating vapors permeated through the crates and the egg shells.

In a certain sense food spoilage does not stop even after the consumer has eaten the product. Raw clams contain an enzyme which destroys thiamine. This enzyme operates in the human gastrointestinal tract and is capable of destroying a major portion of the thiamine ingested with the meal. In this connection, recent studies have indicated that ascorbic acid oxidase does not continue its destructive action after ingestion, nor does copper, which ordinarily catalyzes this destruction, interfere with the availability of the vitamin in the human digestive tract.

...with smooth-rolling ELECTRUNITE HEAT EXCHANGER TUBES

It's SPEED that counts in getting vitally needed "off steam" heat exchanger equipment back on the job . . . and it's SPEED which you get when you install long-lasting Republic ELECTRUNITE Heat Exchanger Tubes.

As produced by Republic's special process of cold forming and electric resistance welding, each tube is perfectly round and sound—consistently accurate in wall thickness—always uniform in strength and straightness—clean and free from corrosion-inviting scale and scale pits.

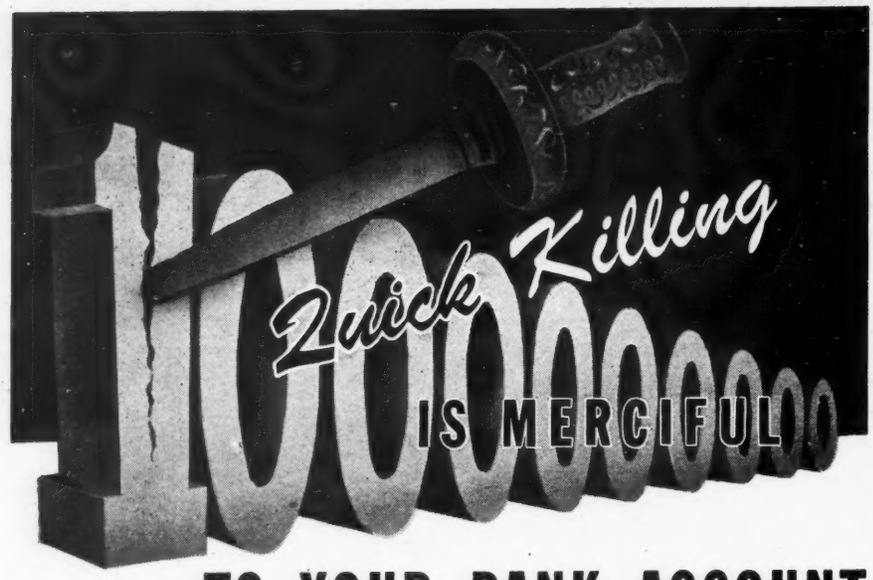
And that's not all! Full normalizing of every tube, throughout its entire length, eliminates any need for annealing after the tubes reach you. No matter where or how you cut them, *all* ELECTRUNITE Heat Exchanger Tubes are smooth and ductile, ready for instant rolling-in.

For complete information about ELECTRUNITE Heat Exchanger Tubes, including a list of sizes, gauges, and analyses in which they are produced, write us *today.*

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic ELECTRUNITE Tubes are made from highest quality flat-rolled steel, both sides of which are open to close visual inspection. Thus the surface which becomes the inside wall when formed into tubing is free from hidden defects.

Republic
ELECTRUNITE
Reg. U. S. Pat. Off.
BOILER, CONDENSER AND HEAT EXCHANGER TUBES



TO YOUR BANK ACCOUNT

In 1945 insects and rodents cost food men over a billion dollars! What was your share? Enough to want to cut . . . which unquestionably Westvaco Methyl Bromide will!

It has demonstrated it gets a complete kill of *all* profit-devouring pests—even in the inaccessible spots where ordinary fumigants fail. Conclusive tests prove Methyl Bromide ventilates so rapidly that only a short shut-down is necessary. Thus Westvaco Methyl Bromide saves valuable time and money!

Other reasons why leading fumigators prefer Methyl Bromide include its harmlessness to food products, its ease of application, its effectiveness at low temperature and its adaptability to every type of fumigation.

WRITE FOR DETAILS

An important supplier of Methyl Bromide, Westvaco offers a constructive, on-the-job technical service in its application. Without cost or obligation, we will be pleased to furnish technical data and to recommend competent nearby industrial fumigators expert in the use of Westvaco Methyl Bromide.

Westvaco CHEMICALS

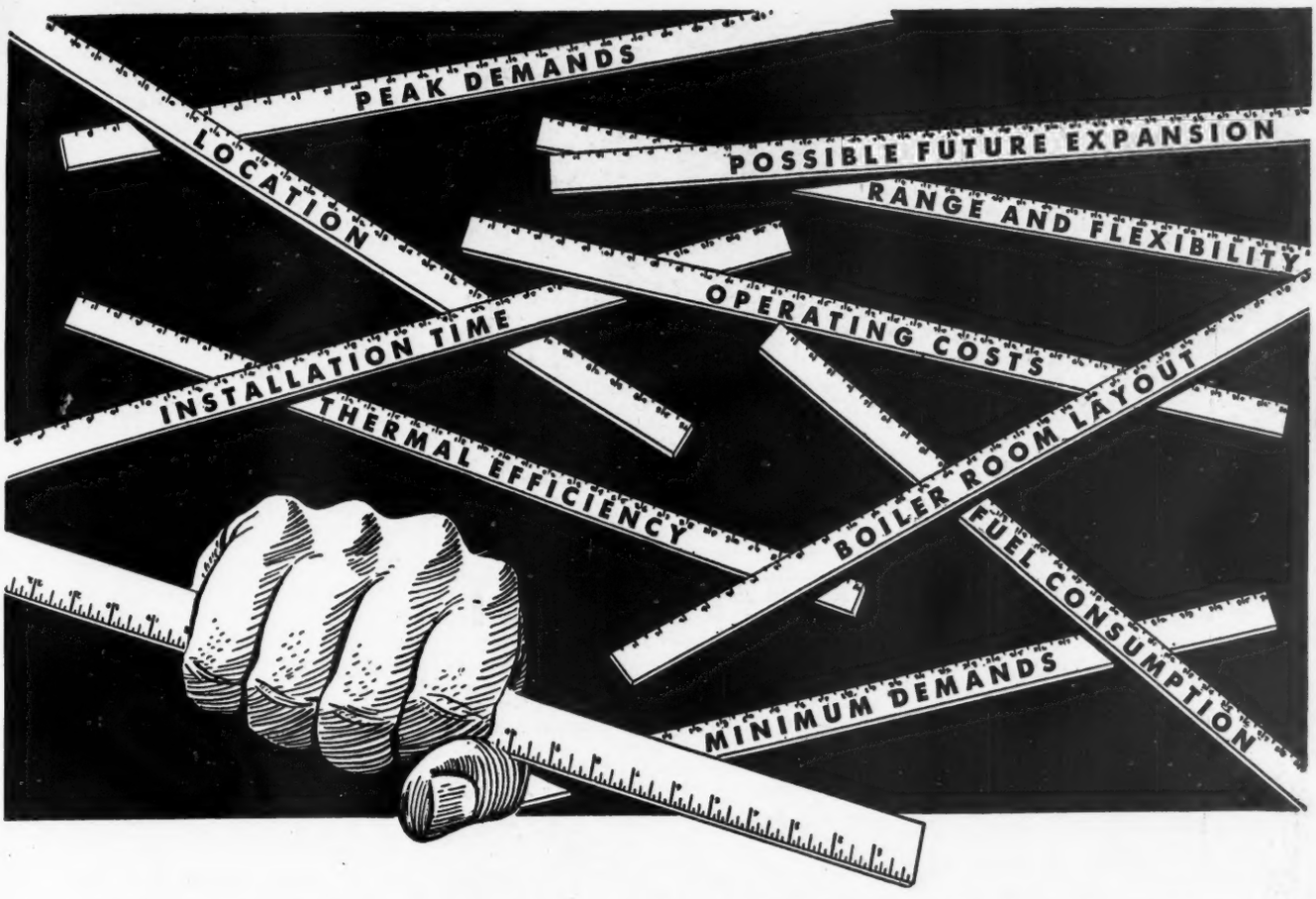
METHYL BROMIDE
FOR EFFECTIVE FUMIGATION

WESTVACO CHLORINE PRODUCTS CORPORATION
405 LEXINGTON AVENUE · NEW YORK 17, N. Y.
CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

Biological Spoilage

There are many ways, then, in which food may spoil by chemical action. However, the technologist's woes do not stop at this point, for there are just as many types of spoilage by biological action. Biological spoilage may be caused by bacteria, yeasts, molds, parasites, insects, and rodents. The magnitude of the problem in each of these categories may be estimated from the fact that in the first group alone, the organisms may be pathogenic or nonpathogenic, spore-forming or non-spore-forming, thermophyllic or mesophyllic, aerobic or anaerobic, each requiring special means of prevention or control. Pathogenic bacteria cause typhoid fever, dysentery, tuberculosis, tularemia, undulant fever, botulism, and bacterial toxemias, all food-borne infections. Milk is a particularly rich medium for the growth of such organisms and the total bacterial count of this product must be kept low. Custards and other egg products are readily susceptible to such spoilage.

Yeasts are useful in the manufacture of beer and ale, and molds are important in the preparation of Roquefort and Stilton cheeses. When present as contaminants in other foods, however, they result in deterioration of flavor, texture, or appearance. In an attempt to reduce to a minimum the initial adventitious contamination with microorganisms, the food processor employs various forms of pasteurization or sterilization. The classical methods of heat processing are being supplemented in part by ultraviolet irradiation and induction heating. Even the possibility of adding antibiotics, like penicillin, as a means for destroying the spore as well as vegetative forms of microorganisms in foods is under consideration. Proper technic is very important during the pasteurization or sterilization process. Incomplete sterilization in home canning may result in botulism. Cans of liver paste containing viable gas-forming organisms have been known to explode. Although molds will not grow in concentrated sugar solutions, poor technic during sterilization may result in a gradient in sugar concentration at the top of the container. Premature application of a cold cap to a jar of hot chocolate flavored sirup may result in condensation of water vapor and subsequent dilution of the upper layers of the sirup, giving rise to superficial mold growth. Recently we were consulted on a problem involving a warehouse full of



WE USE A LOT OF YARDSTICKS

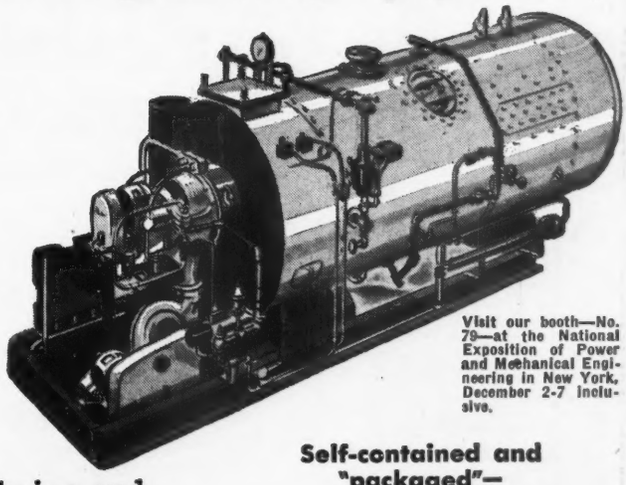
to help you select the proper steam generating equipment!

Fuel and steam costs are usually major items in production and plant operation. That's why it pays to have a steam plant designed to meet your steam loads most efficiently.

Cleaver-Brooks does not sell you a steam generator "off the shelf." Your steam requirements on the basis of present loads and future growth are first analyzed by a Cleaver-Brooks engineer and recommendations are then made for your specific needs.

With sound application engineering of this kind plus basically sound steam plant design and construction, the maximum of lasting value is provided by your Cleaver-Brooks steam generator from the day it is installed. *Write for bulletin and complete information.*

CLEAVER-BROOKS COMPANY, 327 E. Keefe Ave., Milwaukee, 12, Wis.



Visit our booth—No. 79—at the National Exposition of Power and Mechanical Engineering in New York, December 2-7 inclusive.

Self-contained and "packaged"—

Delivery consists of a "packaged" unit. Connections to service outlets are all that is needed. No smokestack is used—a simple vent carries away all products of combustion. No extra foundation is required. Compact—the unit fits into limited space and low headroom locations. Sizes: 22 models—15 to 500 hp; pressures 15 to 200 lbs. p.s.i.

Money-making performance—

The Cleaver-Brooks Steam Generator is designed for easy operation and low upkeep cost. Operation is at 80% efficiency from full load down to 30% of its rating. The high heat transfer from the 4-pass, down-draft boiler produces fast steaming. A boiler room as clean as the home or office is possible through use of oil for fuel.

WRITE on your business letterhead for the Free Steam Cost-Calculator—a ready-reference slide rule showing the comparative steam costs when using oil or coal as fuel.

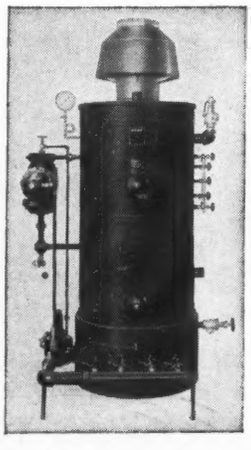
Cleaver-Brooks
STEAM
GENERATORS

Look for Imprint "La Porte" in Metal to Be Sure It's La Porte

La Porte Flexible Steel Conveyor Belting carries your products through every phase of processing—from bin to shipper. Its strong, resiliant steel mesh construction withstands the impact of loading . . . maintains a perfectly flat surface, without stretching, weaving, slipping or jumping, . . . allows free circulation of air and liquids around products in process. It is not effected by steam, acids or extreme temperatures and needs no special dressing to assure efficiency. *Use La Porte Conveyor Belting all along the line — it is available in any length and almost any width. Ask your Supplier TODAY.*

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

FOR STEAM AT *CONTROLLED* TEMPERATURES



The KANE Boiler, in sizes 1 to 30 H.P., built to A.S.M.E. specifications.

Investigate *ENGINEERED* STEAM. It's a steam source . . . compact, self-contained, and tailor-made for your job . . . that includes: the study and solution of your problem; the correctly sized and constructed KANE Automatic, Gas-Fired Boiler; the Necessary Controls to maintain proper steam pressure and temperature; the M-K-O Automatic Boiler Feed to provide a constant water level for highest boiler efficiency; and the Engineering and manufacturing Experience (of more than four decades) to assure you of an efficient, economical installation.

Although current demands cannot be supplied *immediately*, we'll try to fill your urgent needs as soon as we can.

MEARS-KANE-OFELDT INC.
Manufacturers of Automatic Steam Boilers for over a third of a century
1903-1915 EAST HAGERT STREET, PHILADELPHIA

frozen corned beef hash which had been inadequately processed at the time of packaging and too closely stacked, so that spoilage occurred especially in the interior rows. The potatoes in the hash underwent fermentation due to the presence of viable bacteria and yeasts.

Spoilage Prevention

Some of the recent developments in the prevention of biological food spoilage are of interest, particularly those employing induction or dielectric heating. Mold growth has been inhibited in sliced bread by high frequency heating of the sealed package. Weevils may be killed in packaged pancake flour, rice, cereals, and other dry foods, by this means. A recent report describes how raw ground meat in a sandwich of dough is placed in a plastic wrapper and then passed through a dielectric heater. The one operation cooks the hamburger, bakes the dough, seals the wrapper, and yields a sterile product. Electronic heating, however, has its limitations; for example, it is not applicable to foods packed in metal containers, nor has it been possible to adapt it to the sterilization of cream puffs and eclairs because the crust burns before the center filling heats up.

Food-borne parasites constitute an important problem to the processor. Destructive measures should be taken against trichina encysted in the muscles of hog meat and tapeworms in infected pork and in fish. Amebic dysentery which, according to one observer, infects 10 percent of the population of this country, is very easily spread by infected food handlers and by insects. Among the insects which, by their own presence, contaminate foods are *Triboleum confusum*, the sawtoothed grain beetle, the rice or black weevil, the granary weevil, the Indian meal moth, the roach and the ant. Attempts to control insect pests include high speed centrifugation, heat processing at 130°F for 30 minutes, and the use of chemical fumigants like ethylene dichloride, hydrogen cyanide, methyl bromide, carbon disulfide, propylene dichloride, and DDT.

It may be well to emphasize at this point that spoilage is generally not limited to any one set of conditions. For example, bacterial decomposition is favored by elevated temperature, moldiness requires a moist atmosphere and darkness. Spoilage sometimes occurs in steps, like a chain reaction. For example, the spoilage of milk commences as a multiplication of bacteria followed

for Brewery or Food Plant . . .
it's CRANE for Piping Materials

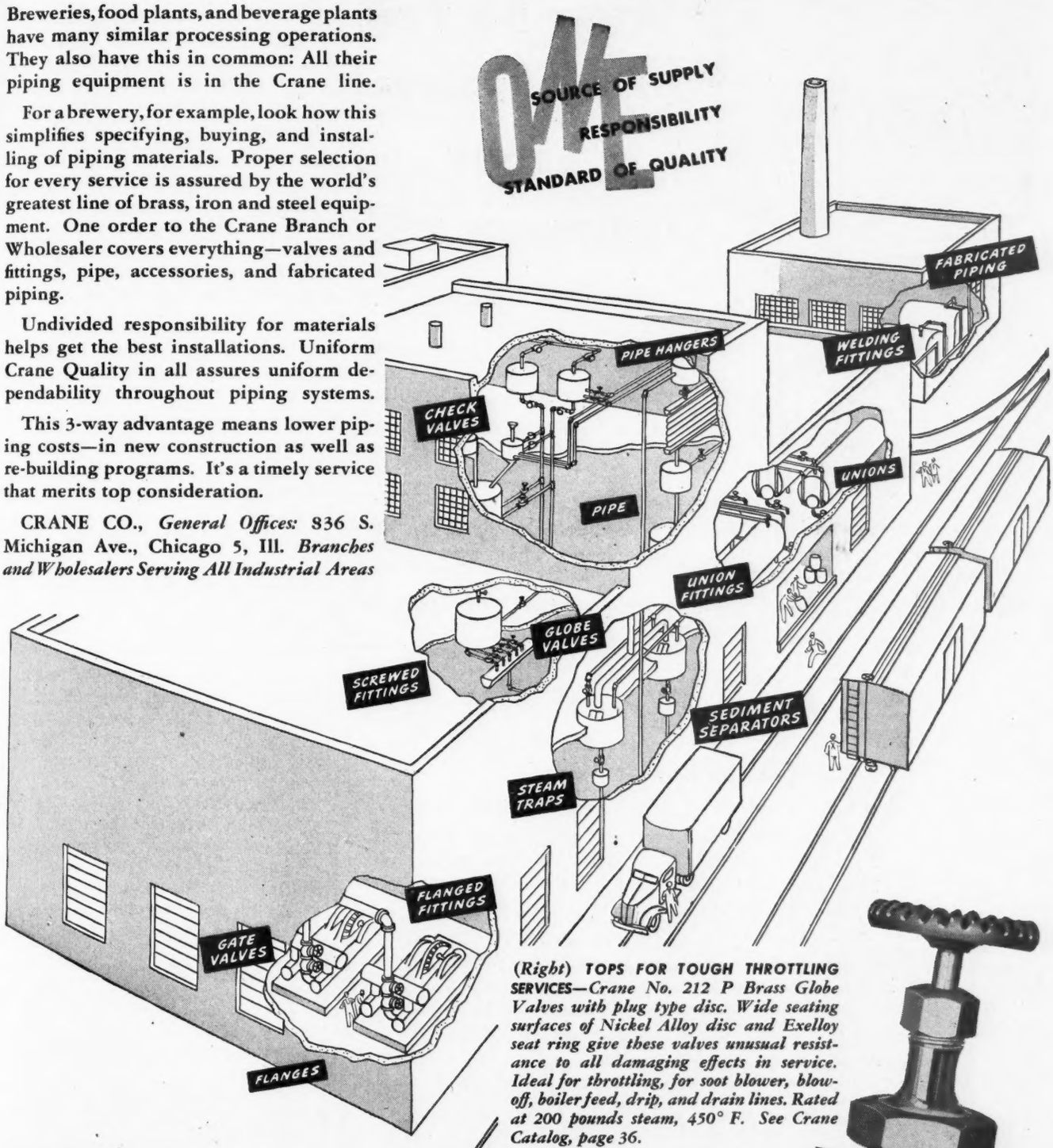
Breweries, food plants, and beverage plants have many similar processing operations. They also have this in common: All their piping equipment is in the Crane line.

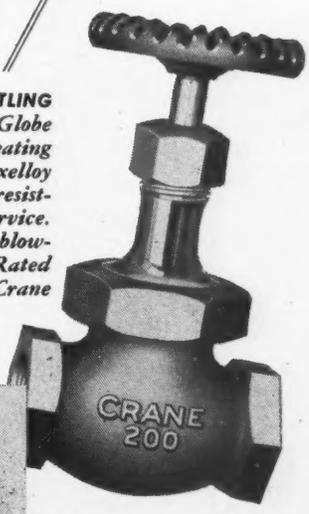
For a brewery, for example, look how this simplifies specifying, buying, and installing of piping materials. Proper selection for every service is assured by the world's greatest line of brass, iron and steel equipment. One order to the Crane Branch or Wholesaler covers everything—valves and fittings, pipe, accessories, and fabricated piping.

Undivided responsibility for materials helps get the best installations. Uniform Crane Quality in all assures uniform dependability throughout piping systems.

This 3-way advantage means lower piping costs—in new construction as well as re-building programs. It's a timely service that merits top consideration.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas*





***(Right)* TOPS FOR TOUGH THROTTLING SERVICES**—*Crane No. 212 P Brass Globe Valves with plug type disc. Wide seating surfaces of Nickel Alloy disc and Exelloy seat ring give these valves unusual resistance to all damaging effects in service. Ideal for throttling, for soot blower, blow-off, boiler feed, drip, and drain lines. Rated at 200 pounds steam, 450° F. See Crane Catalog, page 36.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

WHAT DO YOU *really* KNOW ABOUT VITAMIN D?

HAVE YOU considered *all* the sales factors that can result from the incorporation of vitamin D in food products?

For example, do you know:

That vitamin D, nutritionally-valuable as it is to growing children and some adults, can be found in appreciable amounts only in a *few* common foods?

And that the potential market of vitamin D consumers is growing all the time?

Yes, these are sales factors to be considered. Because, for some food products, vitamin D incorporation can be very important in determining consumer preference.

CONSIDER THE MARKET

Children under nine years of age—most important group of vitamin D users—are increasing in numbers. By 1950, it is estimated this will be the largest 10-year-segment group in the population—some 27,000,000. They'll *all* need vitamin D rich foods.

And here's a further influence on sales. The modern housewife, particularly one with children, is keenly aware of the nutritional importance of vitamin D. Surveys show that women know more about D than any other vitamin, know that it can easily be incorporated in some foods.

The market is here. This may be your opportunity to take advantage of a unique situation for product improvement and competitive leadership. If so, write *now* for full information regarding Vitamin D (A.R.P.I. Process) and its possible incorporation in your product.

General Mills, Inc.

Special Commodities Division

MINNEAPOLIS 15, MINN. 80 BROAD STREET NEW YORK 4, N.Y.

by elaboration of enzymes which cause production of lactic acid, which reaches a sufficient concentration to induce coagulation and separation.

In view of the great number of ways in which foods may spoil, what must the food processor do in order to avoid this loss? First, he must have a thorough knowledge of the causes. In order to prevent incipient spoilage, he may desire to improve the technics of handling the fresh plant or animal materials. He should exercise proper technological control over packing, shipping, and storage. The technologist who has had diversified experience can often solve such problems employing measures used in other fields, sometimes only remotely related to the one in question. Considering the many possibilities for destructive change or contamination to which foods are subjected in their transit from farm to table, it is to the credit of the industry that the incidence of spoilage is as low as it is.

—End—

Double Overwrap

(*Continued from page* 83)

The experiments demonstrate that the double overwrap markedly increases the barrier effect. This is particularly obvious in the instance of waxed paper, which showed a five-fold increase in water-vapor resistance. The efficiency of the cellophane overwrap was increased three-fold.

Although this increase in barrier effect may be due in part to offset points or areas of leakage, it is probable that the transference of coating from one sheet to another in the fluid state during heat sealing is also involved. Known facts regarding destruction of coatings during heat-sealing[3,4] imply that it is possible that the second overwrapping operation results in a partial resealing of the porous areas of the first overwrap.

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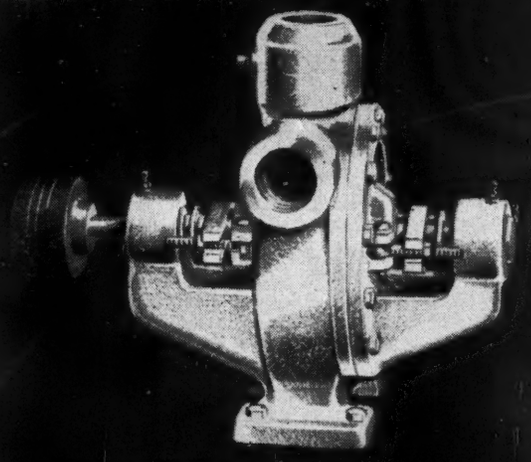
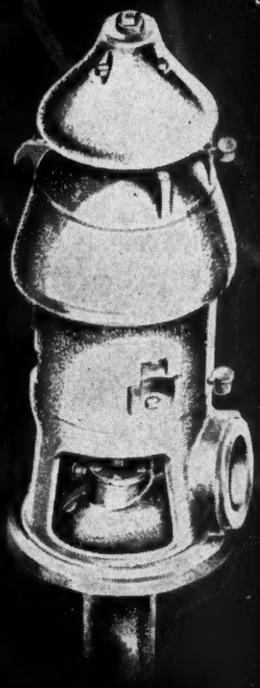


THE WESTCO LINE of precision-built pumps: unique advantages in long-life and varieties of use for small-capacity pumping of all types of liquids. High heads, low speeds.

FAIRBANKS-MORSE split-case centrifugals are first in their class for sustained high efficiency.



FOR VERTICAL TURBINE WORK—the complete line of Fairbanks-Morse and Pomona turbine pumps. At home—and well-proved—in farm or factory.

Impartially Yours . . .

for lower cost fluid-handling

When you are after lower cost liquid-moving, you want 100% impartial advice from men with second-to-none records of applying the right pump to all types of water-handling jobs! For this kind of engineering service—*and for a complete line from which you may choose*—there's no substitute for Fairbanks-Morse. Here's a single source for all your centrifugal, turbine, and special pumping needs—one "pump store" to simplify your pump-selection and servicing problems to the vanishing point!

IF YOU'RE AFTER any of these advantages, see your Fairbanks-Morse dealer or call the nearest Fairbanks-Morse office.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES · DIESEL ENGINES · MAGNETOS · GENERATORS · MOTORS · PUMPS
SCALES · STOKERS · RAILROAD MOTOR CARS and STANDPIPES · FARM EQUIPMENT

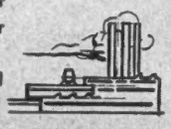
The Zenith Pulp Press, with capacity up to 26 tons per hour, thoroughly dewaters wet pulps and slurries such as:

Beet Pulp • Citrus Wastes • Tomato Pomace • Cherries • Corn Fibre • Paper Pulp • Reclaimed Rubber, etc.

Heavy screw-type spindle applies smooth, continuous pressure, forces pulp or slurry against selective resistance. Rifle drilled resistors permit use of steam when necessary. Minutely perforated screens assure efficient drainage, hold pulp losses to minimum. Ball thrust bearings and oversize shaft bearings reduce power load.

New uses for the remarkably efficient, profitable Zenith Pulp Press are being constantly developed. An experimental press is available for trial in your plant.

Write for full information.



JACKSON & CHURCH CO.
SAGINAW, MICHIGAN

Better Lighting

(*Continued from page* 99)

and generally getting in the way. The best lighting job ever installed is of no value if it isn't maintained, and it is just as important to keep reflectors washed and lamps renewed as it is to oil the machinery.

In conclusion, there is no question of the value of adequate lighting to increase production and promote safety in food plants. Proper lighting design is not simple. A competent engineer is the first requisite for a balanced lighting layout. There are private consulting lighting engineers available in some areas, or one can turn to the power company for aid in checking present lighting or planning for the future. Production and safety depend on seeing, and seeing is a function involving the object, the eye and light.

—End—

Corn Sirup

(*Continued from page* 79)

lation with the storage tank located on an upper floor, or it may be located under the ceiling or roof of the operating floor. This permits gravity flow to the kettles. The system is quite satisfactory in cases where the building can support the additional loads safely, and when the kettles are located fairly close to the storage tank. Fig. 5 shows a railroad tank car installation, with one pump arranged to unload the tank cars and supply the kettles from either the tank car or the storage tank.

Various other arrangements are possible. Members of the sales service staff of sirup manufacturers with many years of factory training, are glad to advise on the latest and most efficient system to suit particular factory conditions. Some systems require pumping as high as the 10th floor, in others the storage tanks are located in out-of-the-way corners. Streamlined tank trucks, or railroad tank cars, are emptied mechanically into the storage tanks. From these tanks sirup is run into kettles as easily as water is drawn from a faucet.

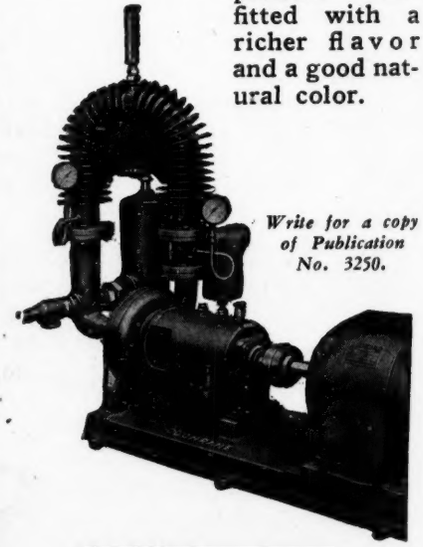
The savings effected by a modern corn sirup system have, in many cases, paid for the installation in less than one year. Other advantages, such as cleanliness, improved labor relations, and reduction in accidents are also important.

HOTTER KETTLES

Through New Method of Heat Transfer Result in Better Quality of Product

Control of quality starts at the kettles. Uniformly HOT kettles, brought to a boil with speed, not only retain the color, texture and flavor of a product, but will effect tremendous fuel and time savings . . . The Cochrane C-B System of High Pressure Condensate Return—a system that drains condensate from process equipment and returns it to the boiler at practically the same temperature and pressure—brings kettles to a boil quickly and maintains a uniform temperature while cooking.

One manufacturer of catsup and chili has reduced "break" time from 180 seconds to 70 seconds while reducing batch time by 28% and fuel cost 16%. In addition to these savings, the product benefitted with a richer flavor and a good natural color.



Write for a copy of Publication No. 3250.

COCHRANE CORP.
3117 N. 17th Street,
PHILADELPHIA 32, PA.

COCHRANE C-B SYSTEM

CONDENSATE RETURNED TO BOILERS AT HIGH PRESSURE AND HIGH TEMPERATURE

Specify STAINLESS for protection of product purity

Specify GLOBE for Stainless Steel Tubes of uniformity and quality

OUTSTANDING for protection against corrosion and product contamination, stainless steel tubing has won an important place in the production and processing of America's foods, beverages, chemicals, oils, and other process products.

Stainless steel tubing has no cracks or crevices and because the walls are stainless steel straight through, daily scouring only adds to its polish and keeps it brightly clean and sanitary. Since it has no coatings to wear through stainless steel tubing develops no pockets to harbor bacteria.

Since stainless steel tubes are available in many analyses, care should be taken in selecting the stainless steel tubing of the right alloy for a specific application.

Globe stainless steel tubing is available polished inside and out in both seamless and welded (Gloweld) types.

With Globe's wide experience in supplying industry with stainless steel tubing of uniformity and quality you can be sure of safety and sanitation when you specify "GLOBE."

Write for Bulletin No. 115 giving complete information on Globe stainless steel tubing.

GLOBE STEEL TUBES CO., Milwaukee 4, Wis., U. S. A.

GLOBE STEEL TUBES

GLOBE TUBES

3010

★ Pressure Tubes
★ Condenser & Heat Exchanger Tubes
★ Seamless Stainless Steel Tubes
★ Globeiron High Purity Iron Seamless Tubes
★ Gloweld Welded Stainless Steel Tubes
★ Mechanical Tubing

NATURAL
FLAVORING
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SINCE 1921

TRUE FRUIT CONCENTRATES
ESSENTIAL OILS
VANILLA CONCENTRATES
OLEO RESINS
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You'll want these pure, wholesome flavors for all your quality products . . . syrups, relishes, preserves, jelly powders, confectionery, ice cream, beverages, cake products and fondants. DREYER imitation and pure flavors are concentrated, possessing great strength and carrying power. Economical, too, a small quantity produces a delectable flavor.

SEND FOR SAMPLES AND CATALOG C
on your company letterhead

P. R. DREYER, INC.
1191 West 19th St. • New York 11, N.Y.

Guava Pectin

(*Continued from page* 81)

an excellent source of pectin for the production of jams and jellies.

The greatest advantage of this form of dehydrated guavas is that it can be shipped economically to distant markets in a very convenient and stable form. Such a product could enter the pectin markets in competition with other pectin products. Since it does not lose the jellying properties of the original fruit, it can always be used to prepare guava jellies or can be utilized as a concentrated source of pectin in the production of other fruit jellies.

It could also be used as a flavoring agent in the manufacture of fruit nectars, ice cream, candies and other similar products where the refreshing guava flavor is desirable. The pectin-sugar combination disperses readily when used for such purposes. Lastly, it could be utilized as a means of increasing the vitamin C content of other food products, especially fruit juices. The flavor of guava blends readily with many fruit juices and the addition of this product to certain juices may mean a considerable increase in the vitamin C content of the resulting blended juice. The sugar content of the product can be altered to fit its final use.

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Potato Peeling

(*Continued from page* 101)

temperatures between 36 deg. F. to 45 deg. F. the enzymic processes converting starch into sugar are only slightly reduced, whereas the enzymic processes converting sugar into final H_2O and CO_2 are materially retarded. Hence at this range or below, the storage effect is an increase in sugar content in the tubers. This produces the darkening of potato products manufactured from raw stock taken directly from low temperature storage.

On the other hand when stock is taken from low temperature storage and is placed in a room having

DO YOUR SPRAYS CLOG?

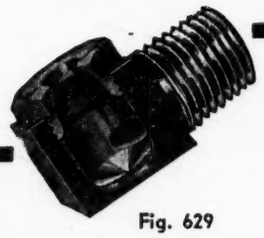

Fig. 629

Here is a nozzle with a single round tangential inlet (instead of several small slots) which permits relatively large solid particles to pass right through and out the orifice. Produces fine breakup, even distribution, and hollow cone spray suitable for numerous applications.

Available in Brass, Stainless Steel and Hard Rubber or made to order in any machinable material. 1/4" to 1" I.P.S.

Send Monarch an outline of your spray problem—if the liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

NOZZLES FOR:

- **ATOMIZING**
- **AERATING**
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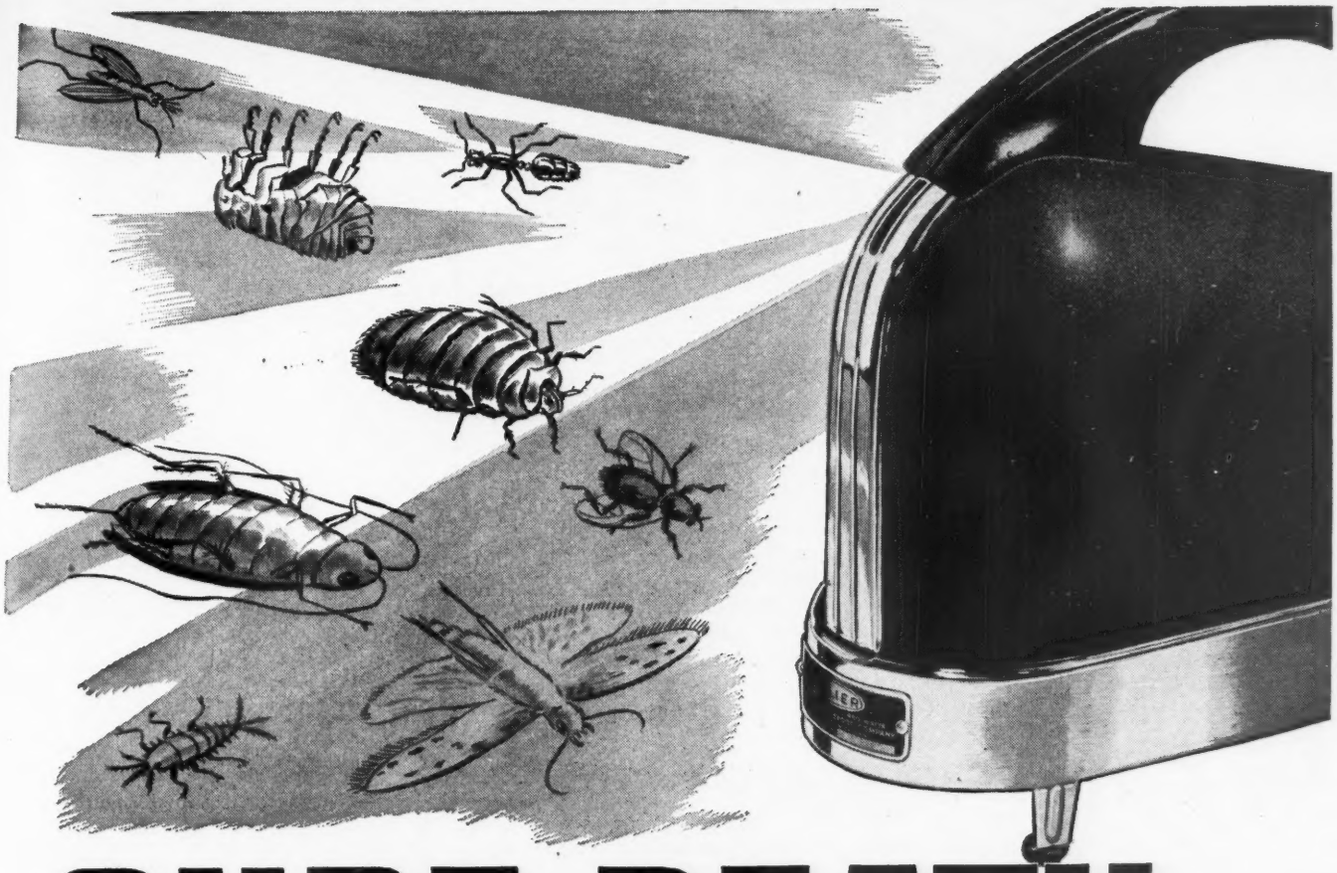

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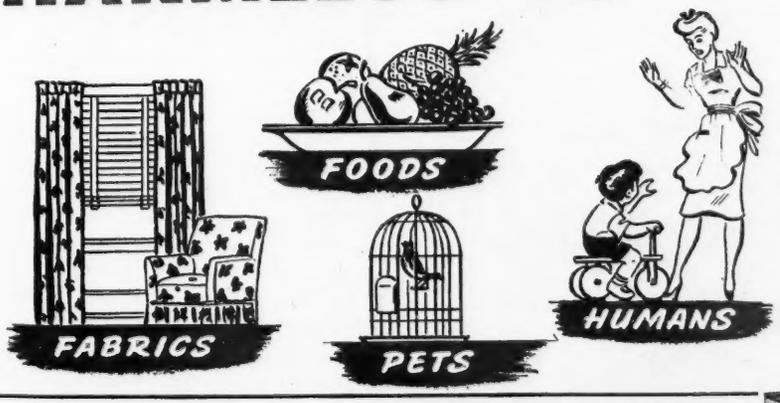

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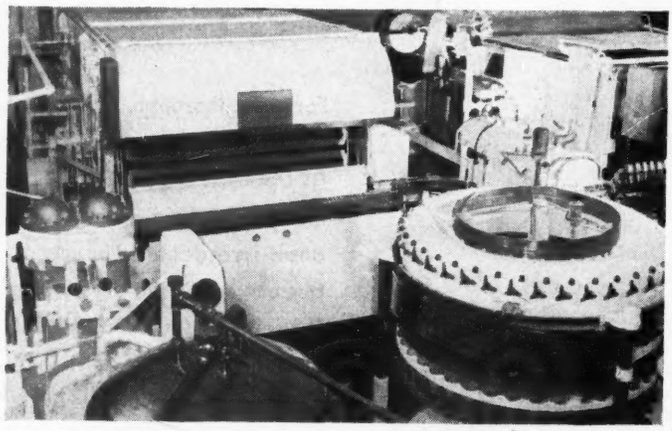

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a temperature between 70 deg. F. and 75 deg. F. the processes of converting the accumulated sugars in the tubers during low temperature storage seem to be accelerated so that in a few days at the higher temperature the starch-sugar equilibrium is re-established. Another cause for high reducing sugar content is due to harvesting potatoes when immature.[3]

Other consequences due entirely to storage or accentuated by it are:

1. **Blackheart**—indicates inadequate ventilation or higher temperature or a combination of both.
2. **Shriveled or Soft potatoes**—usually due to low humidity.
3. **Sprouting**—greatly accelerated by a storage temperature above 40 deg. F.
4. **Decay**—hastened and promoted by high temperature, high humidity and a lack of air circulation.

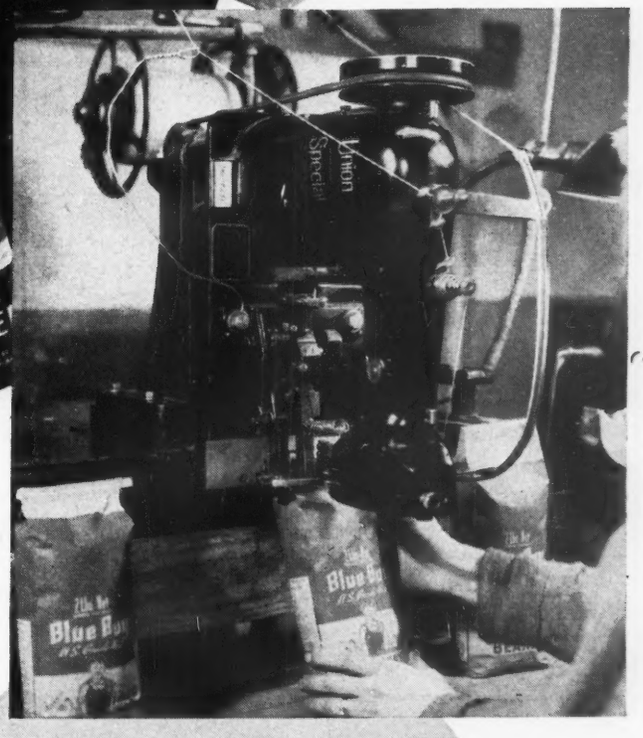
It has been established[2] that raw potatoes must contain less than 3% of reducing sugars (dry weight basis) to avoid the production of dark potato products.

Potato discoloration may also be due to causes other than reduced storage temperature. Several of these are here mentioned only in outline. Stem-end browning,[4] wet necrosis[5] and bacterial vascular necrosis[6] are a few. Experience shows that when diseases are encountered, even in a mild degree, the tubers should be rejected because discoloration will develop in the finished product. This is true even when the visible diseased part has been trimmed off leaving what seems sound tuber for processing.

The second requirement is proper humidity. At reduced temperature and humidity there is continuous dehydration of the stock going on. This is accomplished by the formation of a hard fibrous outer layer, which gets tougher all the time in such storage. Bruises and injuries get deeper. While all of this goes on when the relative humidity is controlled and kept high, it is on a lesser scale. When the relative humidity is low, even though the temperature is low, in time potatoes assume a wrinkled appearance and are rubbery in texture. When stock has reached this condition it is in its worse possible state for peeling and for yield. The optimum storage conditions are reached when metabolic losses are reduced to a minimum by proper control of humidity and temperature in storage.

The third requirement is proper circulation of air in the storage rooms. This condition presupposes that proper precautions have been

Really good packaging!



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that is static-draining, non-sparking, non-dusting, non-denting under ordinary point loads. (Think of explosion prevention and use in hospital operating rooms.)

that resists food and kitchen fats and oils. (Think of a kitchen floor that will not go to pieces.)

that withstands neutral oils and greases. (A floor that will not disintegrate under conditions around machinery.)

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taken to insure even circulation of air regardless of whether the potatoes are stored in bulk or in 100 lb. bags or barrels or bushel crates. No potatoes should be permitted to lie in a dead pocket of air. Proper spacing is important. This includes provision for air circulation at the bottom of the pile.

With proper control of the temperature, the humidity and the ventilation, optimum storage conditions are established in which potato metabolic and other losses are reduced to a minimum and the condition of the stock is kept at its peak.

Part II of this article, which will appear next month, will present the quantitative data on the various methods and will contrast their efficiencies.

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1. "Handling Early Potatoes." USDA Circular 744, 1946.
2. A. Frank Ross et al., "Selecting and Storing Potatoes to Avoid Darkening." *Food Industries*, p. 77, July, 46.
3. Ross, Hilborn & Jenness, *Food Packer*, Sept., 45.
4. Folsom and Rich, "Potato Net Necrosis and Stem End Growing," *Phytopath*, 30:313, 1940.
5. Bonde & Reiner, "Comparative Studies of the Bacteria Associated with Potato Blackleg and Seedpiece Decay," *Phytopath*, 30:831, 1939.

—End—

Canada's Fish

(*Continued from page* 112)

000, for inland fisheries $6,000,000. A total of 77,358 people were employed in the Canadian fishing industry in 1943.

Domestic Market

When the export market for Canadian fish begins to dwindle as Scandinavian countries and British fishermen get back to peacetime catches, Canadian fishing industry will look to developing its domestic market. A report of the Nova Scotia provincial government gives some insight into plans for developing the domestic market. Canadians eat only 12 lb. of fish per year on a per capita basis, as compared to 24 lb. in Great Britain. Major development will be in the marketing of fresh and frozen fish, by handling and merchandising in such a way as to maintain quality at point of sale. Freezing and storage to prevent market gluts and methods of cutting the processing and distribution costs to increase volume of sales in central Canada are recommended in the report. With establishment of quality standards, only first grade fish would be filleted and frozen. Lower grades would go into

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other types of processing. By-product trades like fish meal would take care of waste and marketing excess.

Government action in establishing standards and assisting the economy of the industry can be expected, but the industry and distributive trades will be expected to do their share. Research in new methods of processing and merchandising, publicity on fish uses and education on care and culinary preparation are all looked for in the provincial government's reports.

Modernization of equipment and improvements in storage facilities, refrigeration and transportation are likely to put new life in the Canadian fisheries. The cod-fishing industry is expected to give better returns in the postwar years than during the war years, but modernization will mean fewer men. Lobsters, other shellfish and edible seaweeds are expected to have good possibilities for making the Atlantic coast fisheries prosperous. The lobster catch was the second largest in prewar years.

To aid fishermen Canada maintains research stations, gives training in the most efficient methods of fish processing, has arrangements for adult education help with universities in the Atlantic and Pacific coast provinces and has designed new types of boats for Atlantic coast fishermen. Weather forecasts, ice conditions, data on bait and ice supplies are regularly broadcasted. To aid war veterans who want to go into commercial fishing, loans are made on the purchase of boats, equipment and land on which to build a home and do part-time farming.

Canada's Department of Trade and Commerce will endeavor to maintain as much of the Dominion's fish export business as possible. This can be judged from a recent statement of the department in connection with the current Canadian canned fish program, which says: "The Canadian contribution of canned fish to UNRRA and other relief claimants has been set at the relatively high figure of 40,400,000 pounds. Other considerations apart, this is justified on the ground that the maintenance of stability in the potential markets of the canned fish trade is essential to the long-term welfare of the Canadian fishery."

Canada's fisheries resources are great, and while a drive will be made to develop a higher per capita consumption of fish domestically, the industry must largely depend on export markets until Canada's population is much larger.